TECHNOLOGY 2000

How to Obtain an electronic copy of Technology 2000

Using the State of Utah's Electronic Bulletin Board System (BBS)
Technology 2000 is available at no cost in WordPerfect 6.0 electronic format on the State of Utah's electronic bulletin board system (BBS) by dialing 801-538-3383 (or only if outside the SLC local calling area, dial 1-800-UTAHNET) using a PC and modem. Modem settings should be 8 bits, no parity, 1 stop bit. After entering the main board conference on the BBS, go to the following on the BBS:

Planning & Budget (GOPB On-line)
(4) Information Technology
(1) Technology 2000...here it is. Follow the electronic bulletin board system's on-line instructions / commands to download the Technology 2000 file.

Using an Internet Gopher Server:
Technology 2000 is available at no cost in ASCII format on the University of Utah's Internet gopher server at the following Gopher menu address: gopher.cc.utah.edu:70. Follow this route on the University of Utah's Internet gopher menu, and go to:

Off Campus Information
State of Utah
Governor's Speeches
Technology 2000...here it is.

Using World Wide Web (Mosaic, Netscape, or others) on Internet:
Technology 2000 is available at no cost in a World Wide Web version of this document at URL address "http://www.state.ut.us/agencies/governor/governor/tech2000/".

How to obtain a printed copy of Technology 2000

A printed version of Technology 2000 is available for $12 per copy. Contact: Alan Carlsen, CPA; Governor's Office of Planning & Budget; 116 State Capitol Building; Salt Lake City Utah 84114 or call Alan at telephone number: 801-538-1194 or at Internet address "acarlsen@email.state.ut.us".

Future Versions of Technology 2000

Technology 2000 will continue to be updated in the future. This is the fifth version of this document, the October 1, 1995 edition. Previous versions were the February 1, 1994 version, the April 1, 1994 version, the January 1, 1995 version, and the June 1, 1995 version.

Editorial Comment

Except for Part I, the Vision section of this document, Technology 2000 is based on the contributions of many organizations and individuals and was written by Alan Carlsen, CPA, Governor's Office of Planning & Budget, State of Utah. Readers wishing to contribute source information, comments, or blame someone because they got left out should contact: Alan Carlsen, CPA; Governor's Office of Planning & Budget; 116 State Capitol Building; Salt Lake City Utah, 84114; (telephone: 801-538-1194). Technology 2000 is possible because of the contributions of the many organizations, individuals, and references described throughout this document.

Published by the Governor's Office of Planning & Budget, State of Utah

TABLE OF CONTENTS

C-Band Satellite 151
KU-Band Satellite 151
DirecTV/ USSB DSS Satellite 151
PrimeStar Satellite 151
Cable (TCI, Insight, etc.) 151

Technology 2000 is Utah's initiative to implement an electronic highway.

An electronic highway will inter-connect electronic devices into a single network of computers, telephones, televisions, and other electronic devices. These interconnected devices in the homes of Utah citizen's, within Utah's businesses, schools, government offices, health care providers, and at other locations will enable the transmission of digitized data, full motion video, voice, and still video images.

Technology 2000 is designed to be an easy to understand, one-stop reference source on Utah's electronic highway. The information comes from hundreds of sources as indicated throughout the document. In the many pages that follow, each electronic highway component or service is explained in easy to understand terminology. The benefits and costs of each service are described. If a Utah business or citizen wants to begin using the service, a contact or access methodology is described. Finally, the exact status of the service is described, indicating whether the service is either immediately available for use or when in the near future it will be available. Technology 2000 is intended to be a road map for Utah's citizens to use Utah's electronic highway.

This version of Technology 2000 includes the following:

Part I

The Vision

* Utah Tomorrow Vision Statement for Utah
* Governor Leavitt's "Key Objectives"
* Governor Leavitt's "Gearing Up with Technology - A Centennial Challenge for Educators" Speech
* Governor Leavitt's "Electronic Highway Summit Speech"
* Technology 2000 related comments from Governor Leavitt's 1994 State of the State Speech

Part II
Background Information

* Definition of an electronic highway.
* Economic benefits of Utah's electronic highway investment.
* Explanation of the need for an electronic highway in Utah.
  * The evolution of desktop computing power.
  * High demand business, educational, medical, and personal applications that need increased telecommunications performance.
* Putting it all into examples that people can relate to: Transmitting a digitized 32 volume encyclopedia using different telecommunications methods - a performance comparison.
* Using understandable terms and examples, a description of the different telecommunications technologies.
  * Point to point networks.
  * Circuit switched networks.
  * Data Packets.
  * Packet switched networks.
  * Fast packet switched networks.
  * Data Frames.
  * Fiber optics.
  * Frame relay networks.
  * Data cells and cell relay networks.
  * SONET/ATM networks.
  * What comes after SONET/ATM technology and how long will ATM be the best technology? A peek at the next network technology now in the labs - photonic switching.
* Multiplexing.
* Integrating services in networks.
* Telecommunications network speed ratings: Various flavors of ISDN, T-1, T-2, T-3, T-4.
* The ATM - SONET Group - Optical Carrier (OC-) telecommunications speed ratings and how they work.
* Utah's objectives in selecting an advanced electronic highway technology.
* An assessment of Utah citizen's readiness for an electronic highway.
  * The penetration of personal computers into Utah homes.
* Description of what is needed to implement an electronic highway in Utah.
  * Physical infrastructure.
  * Governance structure.
  * Changing the way business is conducted.
  * Utah's citizens should begin using electronic highway services.

Part III
The Status of
Utah's Electronic Highway Infrastructure

* Utah's planned Asynchronous Transfer Mode (ATM) Synchronous Optical Network (SONET) network infrastructure.
* Utah's fiber network backbone.
* A Map of Utah State Government's Wide Area Network (WAN).
* Electronic highway end-point connection to public facilities (the state's wide area network):
  * State government offices.
  * Public libraries.
  * Utah's public high schools.
  * Utah's public middle schools.
  * Utah's public elementary schools.
  * Utah's colleges and universities.
  * Utah's local city or county government offices.
* Hughes Network Services - 384 Kbps service to Utah homes in 1995 for $15.95 per month, including Internet access.
* Electric Lightwave, Inc.'s Utah Fiber Optic Network.
* An introduction to high bandwidth end point connection technologies, including the advantages and disadvantages of each:
  * Switched Digital Fiber to the Home (FTTH) technology.
  * Switched Digital Fiber to the Curb (FTTC) technology.
  * Switched Digital Hybrid Fiber-Coax (HFC) technology.
  * Asymmetric Digital Subscriber Line (ADSL) technology.
* US West's $160 million Mass Market Broadband Services initiative in Salt Lake County to connect Utah's homes and businesses - phase I of a long range plan.
* Northstar Communications Utah County initiative.
* The Internet - connecting to 20 million computers around the world.
  * An explanation of Internet:
    * E-mail.
    * Gopher.
    * Veronica.
    * Jughead.
    * Usenet News.
    * Mosaic.
    * Netscape.
    * World Wide Web (WWW).
    * Wide Area Information Services (WAIS).
    * Telnet.
    * File Transfer Protocol (FTP).
    * Archie.
* A map of Utah's WWW and Gopher Internet sites.
* Bulletin Board Networks / Utah's Bulletin Board Systems.
* Other national / international networks potentially as large as the Internet:
  * ANCS - AT&T / Novell's Connect Services (completion of detail pages is pending more information from vendor).
  * !NCS - US West / Novell's Inhanced Network Communication Services (completion of detail pages is pending more information from vendor)
  * MSN - Microsoft's The Microsoft Network.(completion of detail pages is pending more information from vendor).
* Utah's connections to national and international financial system networks:
  * FRCS 80 - Federal Reserve Communications System 80.
  * FEDNET - The 1995 replacement for FRCS-80.
  * BANKWIRE / CASHWIRE.
  * ACH - Automated Clearing House.
  * FEDWIRE.

* FEDLINE.
* Financial transaction networks that bypass the Federal Reserve systems.
* Southern Pacific Telecommunications, Inc. fiber optic network within Utah.
* ISDN service to Utah businesses and residences - what it is, when it is coming, and what you need to use ISDN.
* The status of telephone service in Utah - connecting to 1 billion telephones worldwide:
* Signaling System 7 (SS7) service in Utah and what services SS7 can offer.
* Digital Subscriber Signaling System 1 (DSS1) service in Utah and what services DSS1 can offer.
* Advanced Intelligent Network (AIN) telephone services in Utah.
* Cellular telephone service in Utah and current services provided - Voice, FAX, and transmitting computer data using cellular modems / cellular telephones.
* Filling in the gaps in cellular and land based telephone coverage:
* The "Iridium Project" by Motorola's partners.
* The "Globalstar Project" by Loral, Qualcomm, and other partners..
* The "Odyssey Project" by TRW and it's partners. (completion of detail pages is pending more information from vendor).
* The "Teledesic Project" by Bill Gates and Craig McCaw (completion of detail pages is pending more information from vendor)..
* Ricochet service - Metricom's 100 Kbps wireless network service and where / when it will be available in Utah.
* Cellular Digital Packet Data (CDPD) service - McCaw Communication's 19.2 Kbps wireless network service and where / when it will be available in Utah.
* RAM Mobile Data wireless services in Utah.
* ARDIS wireless services in Utah.
* Electronic Paging Services / Electronic Messaging Services / Two Way Messaging in Utah - now more services than just a "beep".
* An introduction to microwave and satellite technology and how it works.
* Microwaves -what they are.
* High Earth Orbiting Satellites (Geostationary or geosynchronous satellites) - how they work.
* Low Earth Orbiting Satellites (LEOS) - how they work.
* Point to point Digital Microwaves - how they work.
* Satellite telephones.
* Global Positioning System (GPS) service in Utah.
* Personal Communications System / Personal Communications Network (PCS / PCN) technology and Utah's planned PCS / PCN service - why they paid $ 9 billion for the rights to provide PCS / PCN services to the US market.
* Utah's public safety radio networks and the 800 MHz project.
    * Current two way radio services in Utah - the 150 MHz and 460 MHz frequencies.
    * 800 MHz technology and why this is needed in Utah.
* What is happening to your TV service and when will you get all those TV channels?
* Utah's one-way commercial TV system(s) infrastructure and services.
* Utah's one-way educational TV system(s) infrastructure and services, including coverage maps of KUED, KULC.
* Utah's two-way educational TV system infrastructure and services, including map of all current EDNET sites in Utah.
* Two-way commercial TV system services available in Utah.
* Cable TV services in Utah - 248, 718 customers in Utah.
* Digital Broadcast Satellite (DBS) service in Utah.
* C-Band satellite system service in Utah.
* KU-band satellite system service in Utah.
* Cable / Satellite Audio Services in Utah.
* Satellite Teletext system service in Utah.
* Radio Broadcast Data System (RBDS) services & commercial radio.

Part IV
Services on Utah's Electronic Highway

This section is a "how to guide" for using Utah's electronic highway services.

How to use Utah's electronic highway to:
* Communicate electronically using e-mail to or from:
* State government elected officials (Governor, Lt, Governor, State Legislators, Attorney General, State Auditor, State Treasurer).
* Other state government officials and employees.
* Millions of other people in the world using:
    * Internet electronic mail.
    * Commercial on-line electronic mail services.
    * Other electronic mail methods.
* Obtain state government information electronically from your home or business using the new State of Utah electronic bulletin board system (BBS).
* How to use the electronic highway to obtain copies of:
* Utah Legislative Bills - the LIPS system and other methods.
* Announcements, agendas, and minutes of state government meetings.
* Utah's 78 volume Utah Code, the Utah Constitution, and Utah Appellate and Supreme court cases.
* Information filed in Utah's Court system - the XChange system.
* How Utah's citizens can obtain free access to the INTERNET from:
* Your local community library.
    * Your college or university.
* Your high school, middle school, or elementary school.
* Your state or local government office.
* Your newspaper provider (the Salt Lake Tribune).
* How Utah's teachers can get Internet access now - Using Utah Link for Internet access and services using dial-up telephones with modems.
* How to obtain low-cost Internet service in your home or business, including a description of the advantages and disadvantages of each option from:
* Utah's new Internet service providers.
* National Internet service providers.
* National limited Internet service providers.
* An introductory explanation of the world of electronic payments - ACH; EFT; EDI; EBT; Magnetic strip cards (ATM, debit, and credit) and Smart cards
* The "Utah Horizon Project" - Electronic Benefit Transfer payments for:
* Food stamp program benefit payments.
* AFDC program benefit payments.
* Utah General Assistance program benefit payments.
* Public Assistance (PA-IV-D) program child support payments.
* The "AcessUtah Project" - Utah's new magnetic strip card drivers licenses.
* Using ACH electronic payments to automatically deposit your payroll or retirement check.
* The status of electronic payments in Utah state government.
* Utah state government employee payroll disbursements.
* Utah State Treasurer investment transactions.
* WIC - Supplemental Food Program for Women, Infants, and Children payments.
* Medicaid program payments.
* Student Loan program payments.
* Unemployment Compensation program payments.
* Employee Second Injury Fund program payments.
* How to use the electronic highway to automatically pay your recurring monthly bills.
* Monthly loan payments (mortgages, vehicle loans, etc.).
* Monthly insurance payments.
* Monthly Utility payments:
    * US West's "Automatic Payment Plan".
    * Questar Natural Gas.
    * Utah Power & Light's "Electric Check" plan.
    * TCI Cable / Insight Cable / Cablevision.
    * Your local water, sewer, and garbage service provider.
* Use the electronic highway to improve cash management practices in your business or not-for-profit entity with ACH cash concentration services.
* Utah's new electronic library services and the "Utah Library Network".
* Use the new Utah Health Information Network (UHIN) for:
* Electronic settlement and payment for health care services (hospitals, doctors, dentists, and other health care providers).
* Electronic interchange of health care data allowing physicians and other medical professional s to exchange medical information (Telemedecine).
* Convert your business to a completely electronic purchasing and payment system called EDI.
* Use the electronic highway to conduct electronic commerce to:
* Sell your goods or services to the state.
* Sell your goods or services to the federal government.
* Using the electronic highway for:
* Video arraignments in Utah's jails and court system.
* Board of Pardons and Parole hearings.
* State government business meetings.
* Using the electronic highway to improve our schools using:
* Governor Leavitt's "electronic high school".
* Governor Leavitt's "electronic college" courses in high schools.
* Obtain state government services in convenient locations using KIOSKS to:
* Purchase a hunting or fishing license.
* Obtain copies of birth or death certificates.
* Obtain information about traveling in Utah from the Utah Travel Council.

* Renew your driver's license.
* Renew your business, occupational, or professional license.
* Renew your motor vehicle, boat, or RV registration.
* Enroll in a college or university class.
* Make a reservation at one of Utah's parks.
* Register to vote.
* Obtain immunization records about your children.
* Find our about job vacancies, by job categories, in local, state, or national job data banks.

* Use the electronic highway to:
* Remotely deal with Utah Courts:
    * File court cases electronically using "COURTLINK".
    * Track the status of court cases using Court's new electronic bulletin board system (BBS) - the "XChange System".
* Remotely deal with the IRS and Utah State Tax Commission:
    * File your individual federal income tax return(s) electronically with the IRS.
    * Use Tax Connect services: the value added network to electronically file your individual income tax returns and electronically pay your taxes on the due date.
    * Use the Utah State Tax Commission's "JELF" program to file your individual state income tax return(s) electronically.
    * File and pay payroll withholding and sale tax deposits to the Utah State Tax Commission.
    * Obtain FAX on demand services from the Utah State Tax Commission when you need tax forms, bulletins, etc.
    * Electronically access the Utah State Tax Commission's Appeals Tracking System (county governments only).
    * Use telephony based services to file "no activity" tax returns still required by law to be filed.
    * Transfer and obtain state data maintained in CD-ROM data format:
        * Package X (federal and state tax forms) maintained by the Utah State Tax Commission.
        * Motor vehicle registration data maintained by the Utah State Tax Commission..
* Remotely deal with the Utah Department of Employment Security:
    * File wage list information with job Service using the "JSWAGE" system.
* Remotely deal with the Utah Department of Commerce:
    * Remotely file and obtain Uniform Commercial Code (UCC) secured creditor information electronically using the DATASHARE system (For details, see the imaging section below).

* Use Geographical Information System (GIS) services available on the electronic highway to obtain 200 different types of data about Utah arranged in overlaying layers and cross-referenced by detailed geographic location.
* Use the electronic highway to manage millions of pages of state documents - Imaging Systems in state government:
* Board of Pardons and Parole records - 2.5 million pages of high security records.
* Electronically filing and obtaining Uniform Commercial Code (UCC) information , state incorporation, and business records- the Department of Commerce's DATASHARE system to manage 3 million documents.

* New strategic information systems in state government that will use the electronic highway to improve the management of state government:
* FI-NET - the new state government financial management and accounting system.
* HR-STREAM - the new state government personnel management system.
* ORSIS - the new child support collection and payment system.
* The new child welfare system - the new state child protection and foster care management system
* O-TRACK - the new state prisoner management system for Utah's correctional institution programs.
* EBCIS - the new state system to improve management of birth and death records, and other vital health department data.
* USIIS - the new state system to improve management of immunization records of children enrolled in Utah's schools and day care facilities.
* ACTION 2000 - the new state system to improve management of health department information used by local health departments.
* POINT OF ENTRY - the new state system to improve management of commercial vehicles entering and exiting Utah.

Part V
The Electronic Highway Governance Structure

* Federal legislative changes affecting the electronic highway:
* Utah State legislative changes affecting the electronic highway:
    * Utah H.B. 364, “Telecommunications Reform”
* Utah state government's IT governance methodology.

Appendix A - Television Networks Currently Available in Utah via Satellite and Cable

"We, the people of Utah, stand at the edge of a new frontier. In a world of rapid economic, social, environmental, and technological change, we confront bold challenges and rich opportunities.

Building upon our diverse cultures, our pioneering spirit, and our belief in the inherent worth of every person, we seek to:

NURTURE a tolerant, just, and compassionate society that honors integrity, values strong families, welcomes diversity, and promotes positive moral values.

EDUCATE our citizens by providing an environment that supports lifelong learning and occupational skills and that enables Utahns of all ages to reach their potential as productive and responsible individuals.

BUILD a statewide economy and infrastructure that supports a broad spectrum of opportunity for all citizens while advancing the standard of living and maintaining a high quality of life.

ENHANCE our local and global environment through prudent development, conservation, and preservation of our natural resources while protecting public health.

PROMOTE personal wellbeing by encouraging healthy lifestyles and disease prevention, and by supporting access to quality health care at an affordable cost for all Utahns.

BROADEN our understanding and celebration of the human experience by supporting opportunities in our communities and institutions for artistic and cultural expression, and by nurturing and protecting our diverse cultural, historic, and artistic heritage.

ENCOURAGE selfsufficiency while helping those with special needs to lead productive, fulfilling lives.

PROTECT our society by supporting a justice system that allows Utahns to enjoy a quality lifestyle consistent with the rights and liberties guaranteed under the United States and Utah Constitutions.

ASSURE open, just, and accountable government.

STRENGTHEN our free enterprise system while providing a reasonable regulatory environment that protects our citizens.

PREPARE ourselves, our state, and our children for the challenges of tomorrow, today.

(Utah Tomorrow is a broad-based, ongoing strategic planning effort designed to enable all segments of Utah society to focus on and measure progress toward specific goals for Utah's future. The strategic plan is designed to move away from reactive methods of setting and implementing public policy, and to take a more visionary, proactive approach. The Utah Tomorrow report furthers this aim by establishing a broad vision statement, more specific agreed upon goals and objectives, and performance measures to assure progress toward the goals. The vision statement, goals, and objectives of Utah Tomorrow have been adopted both by the Legislature and the Governor and are consistent with Governor Leavitt's five key objectives)"

Source: Quoted from the Utah Tomorrow Strategic Planning Committee Report

1. Providing a world class education.
2. Creating quality jobs and business climate.
3. Improving government.
4. Enhancing the quality of life for all Utahns.
5. Fostering self reliance.
6. Protecting our foundation of community values.

In the summer of 1994, Governor Leavitt addressed the Utah Legislature and outlined six challenges facing our state. Beginning with FY 1996, Governor Leavitt's budget recommendations are geared toward meeting these challenges:

- Slow our investment in the "bricks and mortar" infrastructure of the past, and invest more in the infrastructure of the future.
- Use what we have better.
- Fuel the economic resettlement of rural Utah.
- Become a generation of planners.
- Make quality our competitive advantage.
- Rekindle a sense of individual responsibility and community values.

By Gov. Mike Leavitt
July 14, 1993

One wintery day I prepared to fly home from Washington D.C. A winter storm had caused a normally 45 minute drive to the airport to be over 2 hours. Upon arriving, I rushed to the ticket counter only to find that my flight and every other one scheduled to leave the airport that afternoon had been cancelled. Still standing at the ticket counter, I set my baggage down to sort through my dilemma when to my shock I observed that the terminal was on fire. Flames emanating from an area 100 feet or so from where I stood shot all the way to the ceiling. I was stunned. Then I made a rather brilliant observation to the ticket agent. "Look at that," I said, "the building's on fire." The ticket agent glanced up from the ticket he was preparing and said matter-of-factly, "so it is."

As I prepared my remarks for today, I concluded that spending a lot of time describing the fact that we have flames of our own shooting into the air -- in the form of burgeoning enrollments, large class sizes and tight funding -- might evoke a similar response from you -- "so it is". Those conditions have existed for years. Having to produce more and higher quality services with fewer resources than ideal, has become a fact of life in both the private and public sectors. So today, rather than focusing on our problems, I want to talk about solutions . . . and what I believe will be the most exciting and challenging era in modern education history. Exciting because solutions exist. Challenging, in that it will require change. Change in the way we think. Change in the way we work. Change in the way we measure our success.

My desire today is to discuss the innovative use of technological advancements -- harnessing and merging -- for the education of our young people -- the enormous capabilities of computers, telephones, television and satellites. And the world-changing result of merging their functions together. The ability to transmit and communicate interactively and instantaneously all sorts of information -- data, graphics, voice and video -- to almost any location.

Growing up, I delivered newspapers around Cedar City riding a big, heavy, red, one-speed Schwinn bike. It had a big frame, wide handlebars and a well-padded seat. It could haul a lot of newspapers, but the hills were murder. I had a route that included Leigh Hill. There are many homes there now, but then only a few. At almost the top was former Representative Haze Hunter's home. Each day I would pause at the bottom of the hill and then pump standing up as hard as I could to get my big red Schwinn to the top of that very steep hill. Each day I would slow to a stop and have to push my load of papers the rest of the way on foot.

At 5 o'clock every afternoon, all the paperboys in town would meet at what we called the "paper shack" to wait for the Wycoff truck to bring the papers from Salt Lake City. I remember the day clearly when I demonstrated for the other carriers my new three-speed bike -- we called them three-speed "racers " then. It had three gears that were changed with a thumb-shifter on the handlebar. Do you remember these? It allowed me to select a high, low or middle gear. By shifting into the lowest gear, if I peddled hard and fast, I could make it all the way to the top of Leigh Hill without stopping once.

Today, all-terrain 21-speed bikes are available. They are an engineering breakthrough . . . lightweight, yet strong, with amazing capabilities. One can shift to extremely low gears and climb steep, rocky hills with relative ease. On straightaways you can shift up to a high gear and burn up a lot of road with one turn of the pedals. The basics are the same. You must still balance, pedal and steer, but tremendous additional capacity has been produced through improved technology. The 21-speed bike offers a variety of options, depending on needs, desires, training, and capabilities. It has many gears, big ones and little ones, and they work together to make maximum progress. It is highly efficient.

Education as we knew it 10 to 15 years ago was much like the old one-speed Schwinn. It was serviceable and dependable, but it had just one speed. While some students pedaled faster than others, the system itself had not made a breakthrough into more gears and options.

However, progress is occurring. I commend our higher education institutions and our public education technology specialists who have worked hard to provide more gears, more speeds in our system. They have made notable and pioneering progress in the use of technology. Our EDNET system allows us to begin this effort with a remarkably strong base. We are expanding it rapidly. This year from 40 sites to 57 sites. The system has been limited because there has been only one channel and there is high demand to use it. So we're quadrupling the capacity from one to four channels. We are also making good progress in our use of Channel 9, the educational channel, and COMNET, a satellite network operated out of Utah State University. We are considered a national leader in distance education. Many of our education leaders in both public and higher education have caught the vision of where technology can take us.

Today, our system offers a limited amount of flexibility and choice, but not enough. You might say we are at the level of the three-speed "racer" bicycle. The system is on the cutting edge of today's technology and is serving thousands. Our challenge is to move to the 21-speed, all-terrain model by keeping pace with new technologies, and rather than thousands, we must serve hundreds of thousands.

To use the system today, a person must go to an EDNET site at a school or public building. As I mentioned, we are expanding from 40 to 57 sites. But, imagine the capacity of a system that is not limited to EdNet sites. A system that literally reaches every home, business and public building in the state -- for that matter, in the nation. From 57 EDNET sites to 500,000. And yes, we're expanding the number of channels. But imagine the unlimited capacity of a system with 500 channels.

This is not just a dream. It will soon be reality. As we speak, fiber optic systems are being planned and constructed by telephone and cable television companies. Within this decade, EDNET-type interaction will be possible over virtually unlimited channels from homes and buildings all over America. The potential impact on education is dramatic . . . no longer is the process restricted by place or space. Major universities in this country will be offering degrees to out-of-state students who never or at least rarely visit their campuses. It will become common for a student enrolled at Utah State to take a class from a professor from the University of Utah, or Southern Utah, . . . or Harvard or Stanford or Moscow or Bejing. Even a little more futuristic are the educational possibilities of holography, and virtual reality. Imagine a renowned professor delivering a lecture in your living room -- by holographic image. At some point in the future we won't have an education summit in Cedar City in July, we'll just stay home and project our image here. Then in the evening we'll enjoy entertainment by projecting the Shakespearean production into our living rooms. And for the fun of it, we'll change the face of Othello to Jerry Sherratt and Rob Bishop to Hamlet. His lines will be . . . "To open the caucus, or close the caucus . . . that is the question."

Other technologies support and hasten this trend. Internet is a world-wide computer network that our teachers, parents and students could use today -- right now -- if we provide relatively inexpensive modem hookups across the state. Much interaction between schools and homes could occur on the Internet and lessons and curriculum could be downloaded by anyone with a computer and modem. And by the end of our Centennial year it will be possible to transmit not just words and data over the Internet, but video and graphics. What does this mean? It means a student could use an ordinary computer with a telephone and extract at any time or any place a lecture, complete with graphics and video and interactive exercises. These are among the most sophisticated curriculum tools known, and are not being used in many of our classrooms.

Add to that CD ROM technology. Currently, CD ROM can be utilized in a properly equipped computer to provide video, text, sound and graphics, all integrated. This year, major electronics companies will begin marketing CD ROM players that are the size of a notebook. The cost will be under $1,000 and the price will drop rapidly.

This means that soon, very soon, the lectures and exercises we are providing students in our classrooms can be enhanced with video, sound, color and text, and delivered any time, any place, and as many times as necessary for the student to understand it. Will all of this replace the professors or instructors on our traditional campus model? No, but it will certainly change their roles and activities. It will mean they spend more time in laboratory settings, or informal gatherings of students, freed from the lecture hall.

Truly, this multi-geared education system will provide many choices and options. It will take what used to be classroom activities to the home, to the college dorm, to many public gathering places. It will move faster overall, but students will have enhanced ability to set their own pace. Students will still have to cover the distance, still have to balance, pedal and steer. They will still have to work hard.
But having the technology is not enough. We must be trained to use it properly. The first time I rode a 21-speed bicycle, I tended not to take advantage of all the gears. The enhanced capacity did me no good until I learned to use it. The same thing happens with new technology. Without training, teachers, students and parents will tend to stay in one or two gears, not using the tremendous capacities available.

1996 is our Centennial year, 100 years as a state. We have chosen to commemorate our Centennial by empowering public schools with the opportunity to restructure and re-invent themselves. We have accepted nearly 100 schools as Centennial schools so far and we hope to add many more in future years. Parents, teachers and principals are making remarkable progress in competency-based education and school-based governance.

It is now time to take another big step forward in both public education and higher education. Today I want to initiate that step by issuing three challenges that will take us to the next level in our pursuit of world-class education. When we hold this meeting three years hence, I hope we can celebrate our Centennial having made dramatic progress in technology delivered education.

THE CHALLENGES

FIRST, I CHALLENGE YOU TO MAKE EDUCATION AN ACTIVITY THAT IS NOT BOUND BY BUILDINGS, PLACE OR SPACE.

Let me elaborate. First, schools and campuses must facilitate, direct and enhance the learning process, but need not always be the location where learning takes place. We must get used to the idea of students learning at home, in dorms, at libraries, other community centers, and at work, not just in college or school classrooms. The learning experience must be extended to any location where a student can access teachers, lessons, tests, and other educational activities.

To do this, we must make a major shift, a historic shift, in our basic strategy. We must invest less in bricks and mortar, and more in technology. At the next legislative session I will announce a technology initiative. It will include components of training, and courseware development, as well as hardware and communications. It will bridge both higher and public education.

It will be a brave initiative because this transition will cost money. But much of the money will come from resources traditionally devoted in the budget to new bricks and mortar. We don't have the capacity to build the infrastructure of the future and still expand the infrastructure of the past at the same pace.

I propose that by the end of our Centennial year we make Utah an exemplary user of the Internet system. Our state will undertake the task of making Internet accessible to anyone with a computer and a modem. This is a major step in advancing the development of electronic highways throughout our state, providing remarkably enhanced communications among parents and teachers, and also providing access to thousands of data bases around the world. It will give every telephone the potential to provide access to the libraries and massive data bases of the world.

Next, Challenge #2: TO GO BEYOND DISTANCE LEARNING TO A NEW VISION -- A NEW LEVEL, MAKING TECHNOLOGY-DELIVERED EDUCATION A PART OF EVERY STUDENT'S EDUCATIONAL EXPERIENCE.

With distance learning we serve thousands. But this is a new vision. A system that serves not thousands, but hundreds of thousands. Not just the students whose unique circumstances create special needs, but a system that serves every student.

I challenge higher education to make available all courses necessary for general associate degrees through technology by the end of 1996. I also challenge you to expand the number of high-demand bachelor's degrees delivered through technology. I'm not just talking about an expansion of television courses, but an expansion into every available medium. Entire courses should be obtainable on compact disk. For that matter -- entire majors could ultimately be placed on disk. The lectures could be filmed live, spiced with video clips, and enhanced with pop-up graphics. Students could be prompted and quizzed by interactive exercises throughout. None of this is new technology. What is new is its universal affordability.

Such courses could be offered with regularly-scheduled labs or discussion, or tests. Groups may meet once a week rather than 3 or 5 times a week. This multiplies the productivity of the instructor.

Should this type of education replace completely our current classroom method? Certainly not. But every student at every level should have a part of their education technologically delivered. Some institutions around the country require students to take one in five credits through technology delivered courses. In Maine, the number of student visits to campuses has been reduced 60 percent in 10 years. Why? Is it just because it's efficient? No. It's a critical part of the educational experience. Technology delivered education should join the three Rs and the college general education core as educational requirements.

We owe this to our students. Technology is changing the way we work, live and learn. Every Utah student should become familiar, not just with EDNET, but COMNET, self-paced computer courses, INTERNET, and other technologies already available, as well as the expanded options that will become available over the next few years. Not preparing students for the technology-delivered world is like not teaching them to read.

But let's not pass over the efficiency benefit. We face expanding pressures. There are economic transitions occurring every day in this global high-tech marketplace. Thousands of people are returning to higher education, seeking the retraining they need to stay in the workforce. This trend will accelerate. Some say we should just limit access. That's not the answer. We must provide some form of postsecondary training to every prepared student, and we will never be able to meet that obligation if we continue a bricks and mortar mentality. If one in five credit hours is delivered this way, not only will we have provided students with an essential educational experience, but we will make major strides in meeting this obligation.

I challenge the public education system to have the secondary core curriculum available for delivery through technology by the end of 1996. I envision the establishment of a Centennial High School, a school with no walls, no bricks or mortar. Centennial High will have no football team, no cheerleaders, no cafeteria. It will be an electronic high school. Students can enroll in it concurrently as they attend a regular high school. They can move in and out, according to their needs. High School credit will be available and a wide variety of classes will be offered. Students from Moab to Midvale, Magna to Manila, will be able to attend Centennial High. Just like in higher education, classes will consist entirely of video, graphics and data, available on compact disk or downloaded over networks, whichever best suits the student's needs. Many classes could include supplemental live discussions over EDNET or personal interaction with local faculty. Others will be completely self-contained.

An electronic Centennial High School can solve many of our remedial education problems in postsecondary education. If students don't have the preparation they need for college they can take technology-delivered high school classes to prepare themselves, complete with small group workshops to address individual needs. This moves us toward the seamless education system we need for the 21st century.

THIRD CHALLENGE: I CHALLENGE YOU TO PICK UP THE PACE IN EDUCATION.

Our system is defined too much by an institutional pace rather than the abilities or circumstances of individual students. For example, many young people waste their senior years in high school. We need to create incentives, financial and other, for high schools to move students though the system as quickly as the student has the capability to move. When a student has mastered high school curriculum, they should go on to college level courses or vocational training.

I propose the creation of a program to accelerate the education of those students who have mastered high school requirements before they would traditionally graduate. We will call it the Centennial Scholarship and Apprenticeship Program. Students qualify for the program by completing high school requirements early. Upon qualification, the state will award a $1,000 scholarship to any state-operated institution of higher education or applied technology center for which the student qualifies. The student may continue to participate in all high school extracurricular activities, including sports teams, band and orchestra, and social events. If the student desires apprenticeship training, the $1,000 can be allocated as a grant to a potential employer upon successful completion of the apprenticeship.

We must also provide adequate incentives for the school. They will be permitted to keep the balance of the WPU, a little over $500, despite the fact that services are no longer being provided to the student.

Centennial High School, with its widespread availability of technology-delivered education, will help make the scholarship program successful because motivated students will have increased access to classes that will accelerate their education.

Utah has a nationally-acclaimed advanced placement program, and we are also doing well in concurrent enrollment. But we can double and triple concurrent enrollment through technology delivered education, providing motivated high school students with countless college options while they are still completing high school.

Colleges and universities, you must eliminate the roadblocks to timely graduation. We need to provide students a means to get their degrees in four years. Many students could earn bachelor's degrees in three years instead of five plus. The major roadblocks to this now are bricks and mortar, place and space, all of which can be eliminated as barriers by offering technology-delivered education. We can make our system more productive, efficient and seamless with technology. Having classes available electronically at times that meet student needs can help prevent much of the delay and gridlock that now occurs.

There are other barriers. While much progress is being made in easing transfers among Utah colleges and universities, improvements are still necessary. The bottom line is, there are a hundred reasons why it takes so long for a student to work through the system. I call upon you to remedy those that are caused by the system. A student needs to be able to get a four-year degree in four years.

CONCLUSION

In conclusion, I recognize that these are difficult challenges. I also recognize that there will be cynics and naysayers. Some will dismiss this emphasis on technology as a passing fad. I assure you that it is not. It is the future. Whether we accept these challenges or not, all of these things will happen one day. The only real question is whether we lead or follow. If we follow, other states, private schools, and even other countries will have an advantage over us. Some traditionalists may see this as simply a way for the governor to avoid focusing on things they view as more pressing, such as higher salaries and more classrooms. I see this as the best way to address those needs. Critics will point out that most teachers, students and parents are undertrained and ill-prepared for technology-delivered education. They are right, but that can and will be changed. Some will argue that lower income and disadvantaged families will be left out. In reality, it is the disadvantaged students that can benefit most from this initiative. Some will say that this abandons the great traditions of the Socratic method. I contend that in many cases we traded in the Socratic method years ago for large impersonal lecture halls. Technology-delivered education brings Socrates back over EDNET, COMNET, INTERNET. The spirit of Socrates will be everywhere, teaching our citizens the critical thinking skills that prepare them for tomorrow.

This is the opportunity of a generation. It is the big gear, the 21-speed, all-terrain version. Technology will never replace great teachers. But it will be a powerful tool in teachers' hands, helping them facilitate and coach, not just lecture.

Utah is enormously well positioned to take advantage of the technological revolution that is occurring. We have a critical mass of world-leading high-tech companies that are willing to help us. Even today, we will make an exciting announcement about WordPerfect coming forward with a great new program to provide computer software training to our teachers and students statewide. We have a well-educated citizenry attuned to the potential of the telecommunications revolution. We have a great advantage in the expertise that already exists in public education, higher education, state government and the private sector. Our major institutions like the University of Utah and Utah State University are providing significant leadership in electronic education. We can make it happen here faster and better than anywhere in the country. We can take our education system from the old factory, assembly-line, one-size-fits-all model, to a decentralized, competency-based system with freedom, flexibility and high efficiency.

We have in this room the people and the power to make these things happen. We are here today as a team. I am only one part of the team. A governor in Utah does not directly control or govern education. I have at my disposal three tools. I have the power to recommend education budgets to the Legislature. I have the power to make appointments to education-governing boards. And I have the power of the pulpit, which I am using today. I will not hesitate to use the others as well.

Together, we will move forward, as a team, in bringing Utah a fast-paced, seamless education system. Thank you.

Presented on Monday, November 8, 1993
By Gov. Mike Leavitt

In my inaugural address 10 months ago, I pledged to lead this state to a whole new level of performance. We have a great opportunity to achieve a new level of performance in the area of information technology. Today, I am calling on all of you, as state leaders and information technology managers, to help in this effort.

In that inaugural address, I told a story about driving from Cedar City to Salt Lake City in the 1950s. It was a much longer adventure than it is today. I used to marvel at the vision of the leaders of that day who saw the need and established a national goal to build an interstate freeway system before traffic became a crisis. It was controversial, but some could feel the excitement of such a daring undertaking. People in the towns throughout rural Utah were concerned about being bypassed by the freeway. And patterns did change. Some areas were left out; others emerged stronger, taking advantage of the increased traffic and inherent flow of dollars.

I described how in this era a new and different type highway must be built. This electronic highway will be critical for the high-paying, high-tech enterprises of the future. And this highway must not bypass any parts of Utah. To be bypassed would mean real isolation and economic hardship.

We have spent several months now investigating and monitoring the development of the electronic highway in Utah. We have held many meetings, made contacts with numerous committees and task forces, and checked progress in other states. We feel we now have a direction and vision with which to proceed. We want to move forward quickly and provide access to the electronic highways and services to our citizens.

Before discussing specific challenges with you, let me share my view of the electronic world with you.

I believe we are entering an exciting new era in society . . . our world is becoming an information ecosystem, and the ramifications are monumental. Futurists believe there will be a massive shift in the nature of work, that the impact of the information age may be as great as the societal changes that occurred during the industrial revolution.

The thoughtful and informed management of these exciting opportunities for increased productivity, improved government services, a new arena of business and entrepreneurial opportunity, and an enhanced quality of life may be the most important item on the public policy agenda for our state and nation in the next generation.

Computer technology has been around for many years. But only in the last few years have a variety of elements converged to drive this transformation. Only now is the digital revolution fulfilling its promise. We should remember that it took some 40 years after the discovery of the light bulb for electricity to effect major changes in society and to dramatically improve productivity. It took that long for power sources to be developed, for lines to be strung, for electrical appliances to be invented, for a regulatory structure to be constructed, for industrial steam engines to be converted, and for the general public to accept this technology and put it to good use. Now, there is little that we do that does not involve electricity. It has transformed society, but we take it for granted.

Today, we stand at the point where digital technology is about to sweep society with the same impact that electricity has had. It has taken a number of years to develop the critical mass of computer hardware, software, networking and public acceptance for this to happen. We are now seeing tremendous productivity surges in the private sector. There's a PC on nearly every desk in the workplace and computer technology is involved in most pieces of sophisticated equipment. What was once an obscure science practiced mostly by what we called computer techies, is now being embraced by nearly everyone. It is the most exciting area of business, and of government, with enormous promise.

We are now seeing the merging of several industries -- television, telephone, cable, entertainment, satellite, wireless, and computers -- into one vast network with many components and parts, and applications and partnerships, but that is all seamless. And this information highway will feature full-motion video, audio, data, image, voice, text, color, and so forth. Eventually, the technologies of virtual reality and holography will become part of it. Imagine the time when, instead of simply talking over the telephone line, we are able to create three-dimensional images of ourselves and project them into physical space, allowing people situated in different locations to virtually meet with each other. What's more, as these industries are merging, they are becoming far more powerful, with tremendous amounts, more capacity, much faster, much more compact -- and at the same time far less expensive. A veritable tidal wave of technology is sweeping over us.

The day is coming -- and soon -- when all Utahns will be able to access information and communicate with each other easily, reliably, securely and cost-effectively in any medium -- voice, data, image, or video -- anytime, anywhere.

As state leaders, this is the future we must plan for -- not using technology of today, but looking toward the technology of tomorrow.

A few months ago, I issued some specific challenges to the education community to accomplish before the end of our Centennial year in 1996. I asked them to make education an activity not bound by buildings, place or space. I asked them to make technology-delivered education part of every student's educational experience. I am pleased with some of the initial response. Today, I first want to focus on state government. I want to issue some general challenges to leaders and employees in state government, and then I want to talk in more specifics.

1. First, I challenge all of us to change the way we think. Operating in the information ecosystem will require a new mindset. We must be willing to change, to restructure and re-invent. I submit that a whole world of possibilities is opened when two people -- or many more -- can sit at separate locations and look at and work on the same documents, see each other, transmit large amounts of information back and forth, and quickly access other people's information and other data bases. The ramifications for citizens services, for business services, for telecommuting, for reducing highway congestion, for reducing pollution, and so forth, are enormous. But we must begin thinking technology, thinking new applications and ways of doing things, if we are to make this vision a reality.

2. Second, I challenge employees and department and division leaders to focus more on technology and less on bricks and mortar. Technology is enormously expensive. We must make these breakthroughs and enter this new world by using existing financial resources. We must find money through reallocation, not through higher taxes. We must find ways to use our resources better.

3. Third, I challenge you to think specifically of ways we can deploy technology to increase our productivity and provide easier access to state information and services to citizens. We must put the state of Utah at citizens' fingertips. Most of the best ideas won't come from the governor or from your department or division director. The ideas will come from the bottom up, from you and your employees who are on the front lines delivering services. What services can be delivered electronically? How can we provide electronic interaction between citizens and government? Can we develop a system whereby a citizen with a computer, a modem, and perhaps a smart card, can register and incorporate a business, renew a driver license, purchase a fishing license, pay taxes and fees, and so forth? I challenge you to review the services your agency provides, the interaction you have with citizens, and determine how you can make those services available electronically.

4. Fourth, I challenge you to make available electronically the enormous amounts of information state government collects. Obviously, we must not violate anyone's privacy and we must maintain security. Decisions about the availability of data will have to be made on a case-by-case basis. But there exists within state government tremendous amounts of information that should be available to citizens. Within my own office and my Office of Planning and Budget we have databases on boards and commissions, registered lobbyists, political contributions, and valuable economic, demographic and budget information. We produce many press releases, position papers and speeches. All of these things should be available to citizens. Other agencies have data that is valuable to citizens and businesses, things like the Utah Code, state administrative rules, daily status of bills in the Legislature, attorney general opinions, court rulings, public event calendars, job listings, consumer information, business listings, state and federal procurement opportunities, training courses, weather information, licensed day-care providers, and much more. This information must be accessible electronically to the public. Presently, much of it is hard and inconvenient to obtain. We can do better.

5. Fifth, I challenge you to encourage a strong competitive environment among the private communications companies that are providing the basic infrastructure for the information highway. The communications infrastructure throughout the United States and Utah is quickly being enhanced with fiber optics cable. U.S. West and smaller common carriers are in the process of upgrading their systems. In addition, companies like TCI, Electronic Lightwave and Wiltel are building fiber optics systems or upgrading existing infrastructure. A competitive environment will allow us to move ahead more quickly with the applications we need in state government. Capacity will be increased and costs will be reduced for both government and the private sector.

Now, all of these things will require a great deal of coordination and collaboration. One of the most important messages I want to leave today is that we must avoid parallel networks and duplication. We must be as efficient and effective as possible. We must work with other education and government entities. We must avoid turf battles and infighting. We must look at the citizen as a customer of the whole state, not the customer of just one state agency. We could easily fall into the trap of building numerous electronic highways, one overlaying the other. A typical high school, for example, could have many onramps supporting multiple highways for instructional video, instructional computing, administrative computing and job placement services. We must strive for the construction of a single highway that will support a maximum number of applications. Tax dollars must be stretched at every level of government and education. I challenge you to work together in a cooperative spirit, avoiding redundant costs and efforts.

To coordinate this effort, I have created an Electronic Highway Task Force, chaired by Ladd Christensen from the private sector with Gordon Peterson, the state's Information Technology Coordinator, as executive director. The Task Force, in turn, has created a number of committees and subcommittees, and is coordinating with other committees and task forces that already exist. I am asking that you work through this structure, which includes representation from all agencies, to move our state into this exciting new world. Let me stress the importance of coordinating with our Division of Information Technology Services, the implementation and services arm of this large effort. We have skilled and visionary people in that division who will be invaluable as you move forward.

Among the key groups who will guide our progress are the Information Technology Policy and Strategy Committee, which consists mostly of department directors, the State of Utah IT Managers, and other IT Steering Committees throughout state government.

Some of these committees in the past were fairly obscure and operated behind the scenes. Today, they are among the most important groups working in state government and they will be key to our success.

Let me issue some specific challenges. We have formed two committees to focus on business services and citizens services. I challenge them to develop, within a year, as full a range of electronic services and information databases as possible.

We must create a state information and services network that is of real value to the business community and citizens. The network should be open and accessible to everyone. Other challenges:

Telecommuting: Many private companies are improving productivity and reducing building construction and maintenance costs by asking employees to work at home, connected on-line to the office. Besides reduced building costs, we reduce freeway congestion and pollution by encouraging telecommuting. I challenge state managers to have as many of our state workers as possible telecommuting by the end of our Centennial year.

Video conferencing: This is closely related to telecommuting. By the end of 1996, I challenge state agencies to cut travel by 15 percent. We need to hold meetings electronically. Avoiding travel will reduce state expenses and traffic congestion. Video conferencing will allow electronic town meetings, statewide public hearings without travel, and video arraignments, eliminating prisoner travel costs and improving security. We must work together with higher education, school districts, local governments and even the private sector to create a unified system that will serve everyone, benefitting citizens by minimizing redundant systems and reducing overall costs. Within a few years, video conferencing is expected to be as widespread as the use of the fax machine is today.

Wireless technologies: Wireless communications will be used to connect and enhance the electronic highway. Wireless communications will provide us with the means to interact with one another without being tethered to the office. Phones, computers, fax machines, radios, electronic tablets, pagers and E-Mail terminals are among the many wireless devices presently available. The advantage of these devices is the portability they bring to the work place. Employees can reach the office any time and the office can reach the employee any time. Numerous wireless communications products and services are being developed and are expected to become less expensive over time. Because of the importance of wireless communications, I have impaneled a task force that will recommend how the state can maximize the use of this expanding technology. The task force will study the type of system we need, what benefits it will provide, how we will fund it, how it will grow and how we will include all levels of government.

The possibilities are endless, including intelligent vehicles and intelligent highways. This technology has many ramifications for law enforcement, allowing agencies to transmit mug shots to patrol cars, silent dispatch, and allowing officers in the field to instantly access law enforcement databases to check for stolen cars, expired registrations and criminal wanted lists.

INTERNET: I challenge you to explore the possibilities of making the INTERNET available to every citizen. It is a technology that exists today that could provide every citizen with electronic mail and a means for parents to communicate with schools. It could also be the means to access state databases.

ATM: I challenge you to develop a strategic plan to bring ATM capabilities to the state. ATM, with its large capacities for interactive video and other applications, is very expensive. But we must determine how we can bring this technology to our agencies and citizens.

WAN: I challenge you to continue to develop the state's Wide Area Network, expanding its capacity as technology allows. Our employees need to make better use of E-Mail, electronic calendaring, task management and work flow management.

Paperless Offices: With more electronic interaction, we can reduce our paper costs. Paperless offices really are possible with new software and data management systems.

Over the last several months, we have spent a great deal of time talking and investigating. Now is the time for action. I hope each of you will commit to helping us take state government into the information era. I don't believe the barrier here is technology. I believe it is lack of vision and unwillingness to change and try something new. Thank you for your support.

When I took office last year, I promised that my administration would take Utah to a whole new level on performance by building on our existing strengths. We have worked hard in the last year to do that, and I feel good about the progress we have made.

In the legislative session that began today, we are proposing a legislative package that continues to capitalize on our unique combination of strengths. My legislative proposals aim to make worldclass education our standard, build a stronger economy a round quality, highpaying jobs, protect as a precious asset our enviable quality of life, increase the efficiency and productivity of state government, and finally, in caring for our needy, foster selfreliance and personal charity.

I begin tonight by addressing a critical need to keep our state's positive momentum: advanced technology. I am more convinced than ever that our future depends on how well and how fast we adapt to the information ecosystem.

This year, we will complete the Education Technology Initiative started five years ago. This excellent program has already provided $50 million and a very good starting position.

But we must double our efforts and, more importantly, engage others as partners in this move to establish a leadership position for our state. Today, I propose a new initiative, Technology 2000, broader in scope, bolder in size, historic in impact. Technology 2000 will coordinate investment with local governments, schools, universities, colleges and the private sector. I propose we appropriate by the year 2000, more than $120 million as the state's share of this investment. And we begin this year with a $30 million down payment.

Technology 2000 will revolutionize education by training teachers and professors, developing technologydelivered courses, and building the largest wide area network of its kind in the world. This initiative will make government more efficient and bring services to your fingertips. It will ultimately provide video interaction, so meetings and classes can be held electronically with anyone, almost anywhere, with participants able to see each other, talk to each other, and work together from hundreds of miles away.

This technology will have a profound effect on rural Utah. It will make a rural location an economic advantage because of the unique combination of life quality and technological access. It will help with our transportation and environmental challenges because in the cities, telecommuting from home will reduce freeway congestion and allow flexible work schedules. Every car not on the freeway means less pollution, fewer accidents, and reduced costs for office space.

It will change our state's public investment patterns. Public schools, higher education, and state agencies must begin to redirect part of what they are spending on traditional bricks and mortar to technology.

But government investment will never be enough. We must form a partnership with the private sector. Companies like U.S. West, TCI Cablevision, Electric Lightwave, MCI, AT&T and local telephone exchanges will be our partners. They are committed to invest hundreds of millions of dollars in fiber optics superhighway, from Logan to St. George, Wendover to Vernal.

Access and affordability are essential, and they can best be ensured through vigorous competition in an open marketplace. Regulators must protect citizens where competition does not exist, but the telecommunications playing field must be leveled to encourage competition and to attract new entrants and investment.

An electronic highway will interconnect electronic devices into a single network of computers, telephones, televisions, and other electronic devices. These interconnected devices in the homes of Utah citizen's, within Utah's businesses, schools, government offices, health care providers, and at other locations will enable the transmission of digitized data, full motion video, voice, and still video images.

The economic effects of states investing in telecommunications infrastructure has been studied by several groups. The WEFA Group, Wharton Econometric Forecasting Associates and Chase Econometrics, project a 20% average compounded rates of return for investment in telecommunications network infrastructure planned in another state (North Carolina). University of California researchers recently estimated that every $1 invested in telecommunications infrastructure in the US produces $5 in economic benefits. These economic benefits arise from:

1. Reduced telecommunication costs as more users use the networks, which drives down the cost per user.
2. Productivity gains across many lines of business and government.
3. Reduced transaction processing costs throughout the economy.
4. Reduced transportation costs.
5. Reduced costs to state and local government from lower demand for construction of new public school buildings, university and college facilities, and government office facilities.
6. Increases in gross state product statistics, employment, and other economic measures directly attributable to these factors improving in the private sectors of the economy.
7. Increases in private sector revenue from new business ventures, such as developing computer software to provide new services made possible by the technological advances in telecommunications.
8 Resultant increases in state tax receipts.

At the national level, the US Computer Systems Policy Project estimates that a national electronic highway initiative will create as much as $ 300 billion annually in new sales across a range of industries.

These figures are average among the 50 states as a whole. However, when it comes to the information technology sector of the economy, Utah is not an average state because of concentrations of the information technology industry in the states of Washington, California, and Utah. According to the Utah Information Technologies Association, Utah currently ranks second in the world as the largest computer software development center. In addition to the giants, such as the newly merged Novell / WordPerfect corporate group, a Wirthlin Group survey determined that Utah has an additional 1,555 information technology related businesses "on the way up". Utah's information technology businesses generates over $6 billion in annual industry revenue and last year experienced a growth rate of 13% over the previous year. Forty four thousand Utah employees work in the information technology industry and employment continues to grow , up 2,000 employees over the previous year, despite large layoffs at Novell / WordPerfect following their merger. Average wages in this industry are 57% higher than other nonagricultural industries in Utah.

The $300 billion national estimate for annual increases in sales produced by the electronic highway initiative must be apportioned among the 50 states, but should produce more economic effects than average in Utah because of the concentration of information technology business in Utah.

Some types of businesses will continue to chase low wage environments around the globe, as has been the recent trend. Other types of companies will increasingly choose to remain in or relocate to and invest in geographic areas whose infrastructure and highly skilled workforce can handle diverse business operations. The United States maintains a large trade surplus in computer software, communications equipment, financial services, and other information intensive manufacturing and service industries. This sector of the US (and Utah) economy should continue to grow and expand in global markets, but this trend is dependent on maintaining competitive advantage. As stated above, Utah is currently uniquely positioned in this market sector. However, as of today, the most advanced telecommunications network recently established in any state is North Carolina's Information Highway. Utah's planned telecommunications network should bring Utah equal to the most advanced network in any state, and assure Utah's competitiveness in business relocation decisions.

Why do we need an electronic highway? For the past 10-15 years, implementations of computer technology advances have far exceeded implementations of telecommunications technology advances. A buildup of an electronic highway will complement the trend of computer technology by substantially increasing our ability to transport digitized data.

As an example of the significant level of computer technology evolution, the advancements of one microprocessor company in the industry is described below. Because more people are familiar with Intel Corporation's microprocessors than others, Intel's evolution path is briefly described below to illustrate the issue. In this example, computer processing power is described as rated by Intel in millions of instructions per second, known as MIPS.

At the beginning of this process, in the early 1980s, Intel executives also announced a corporate objective to introduce a new microprocessor every two to three years that will be at least 2.5 times as powerful as their previous microprocessor generation. So far, they have generally met their objective.

Year IntroducedBasic ModelProcessing Power in MIPSComments19788086 .33 MIPSFollowing the introduction of personal computers in 1981 that used this generation of Intel microprocessor, this was sufficient processing power to replace typewriters and adding machines and reshape work practices in business offices.198280286 3 MIPSMany personal computers with this older generation of microprocessor technology have been retired from service.198580386 11 MIPSCurrently available in personal computers, but many are being retired from service.198980486 41 MIPSCurrently available in personal computers.1993Pentium
(80586 or P5) 100 MIPSCurrently available in personal computers.1995P6 250 MIPS (Est.)Currently available in personal computers (December 1995).Est. 1997 / 1998P7 625 MIPS (Est.)Currently under development at Intel.Est. 2000P82,000 MIPS (Est.)In the summer of 1993, Intel assembled their P8 microprocessor chip engineering design and development team. Intel executives stated their corporate strategic marketing goal to be "2000 MIPS chips to be available by the year 2000 for less than $1,000 per chip".
Clearly, the ability of desktop computers to produce and process information has consistently strongly advanced and will continue to do so. This trend will also continue in PC memory (RAM) and hard disk storage capability of personal computers. Random access memory (RAM) costs are decreasing by a factor of four times every 18 months. Microsoft predicts that the hard disk size of your personal computer today will be the RAM size of your computer in 3 to 5 years. For example, if you have a 200 MB hard disk today, in 3 to 5 years that is the amount of RAM that common personal computers will have. Microsoft also predicts that a personal computer in the year 2000 will typically have 4GB of RAM and 100 GB of hard disk storage space, in addition to the powerful microprocessors previously described.

Besides Intel's microprocessors that were described as the cited example, other microprocessors have or are emerging in the marketplace that are at least as powerful as the current Intel Pentium processors. This list includes the RISC chips from several vendors; the IBM / Motorola / Apple Power PC chip family; Digital Equipment's Alpha AXP chip family; the MIPS Chip family, and other microprocessors as yet unannounced. Also, computers are now available in the marketplace that combine more than one of these microprocessors into a single computer.

Most business information created today is created digitally (using computer programs such as word processing, spreadsheets, databases, etc.). However, the data is usually transmitted and analyzed in paper form. Currently, less than 5 % of business information that we actually need to do our work is received in digitized form. Instead we are flooded with an avalanche of paper that has been produced using computers. If the same information could be received in digitized form instead of paper, it can be better categorized, analyzed, filed, and distributed between business units. This situation leaves us with an unfulfilled opportunity for major productivity improvements, which could be met by an electronic highway.

What types of business, education, medical, and personal uses could this increase in computing power be used for and what type of telecommunications bandwidth will be needed?

Some types of applications produce, consume, and demand high amounts of digital storage capacity, especially graphics type files (digitized pictures). A sample of high demand applications includes:

Video conferencing - Video conferencing is the technology whereby two or more parties can view each other while conducting a meeting over distances. A networking connection transfers digitized picture data between the two connected devices (such as a personal computer screen). Currently, using a 1 to 9 compression ratio (described below), to transmit a black and white quarter-screen sized image at 30 frames per second (like you see a TV screen picture) produces a picture resolution of 320 x 240 picture elements (pels) (this is the picture size) at a density of 8 bits per pel (more density produces sharper, clearer images). A network transmission speed of 2.05 Megabits per second is required to sustain this type of video conference. If the picture size is doubled to 640 x 480 pels at the same 8 bits per pel picture clarity, a half-screen size PC monitor image is produced and requires 8.2 Megabits per second data transmission speed to sustain the video conference. Video compression is a technique where the only portion of the picture image transmitted is the part that changed from the last frame transmission. Backgrounds sometimes do not change, or change very little between picture frames, so the data elements representing the picture background do not need to be constantly transmitted, reducing bandwidth demand with video compression technology. Additional bandwidth is also needed for the accompanying audio portion of the above described video conference transmission example.

As picture sizes, picture quality, the use of color video conferencing, and the number of video conferencing system users increase, the overall network bandwidth needed will significantly increase. (Color requires a lot more bandwidth than black and white.)
Video-on-demand - This is an application where consumers will be able to view video programs (TV, movies, games, etc.) whenever they want to by tapping into a databank of movies and requesting the video services.

Distance Learning - Distance learning is the use of video conferencing technology to participate in public education or higher education classes. The classes may be virtual (virtual means being as if, but not in fact) classes or add-on video conferencing participants to existing actual classes.

Medical Imaging (Telemedicine) - This is the electronic transfer of medical data, such as X-rays, CAT scans, ultrasound pictures, digitized medical pictures, etc. between medical professionals at different locations. Medical images cannot be digitally compressed when transmitted, so they demand higher bandwidth than other types of digitized images. For example, an X-ray cannot use digital compression technology because if an X-ray contains a white speck in the middle of a darker image, it will disappear during digital compression. This white speck may be the beginning of cancer, so its undisturbed visual image must be maintained without using digital compression technology. This significantly increases the needed bandwidth. X-rays are also very high density images, usually about 580 Megabits in file size per digitized X-ray, which further increases needed bandwidth.

Color FAXing - As color printers and copiers increase in use, demand for color FAXing will also increase accordingly. Color images produce significantly larger file sizes compared to black and white images, and will require significantly increased amounts of telecommunications bandwidth.

There are many other high bandwidth demand applications, including: desktop publishing, multimedia applications, computer aided design (CAD) / computer aided manufacturing (CAM), super computing applications, virtual reality, engineering visualization , geophysical visualization , animation , collaborative design, and several others not mentioned.

Transmitting a Digitized 32 Volume Encyclopedia Using Different Telecommunication Methods - a Performance Comparison

The last line of this chart shows the different performance capabilities of the previously described various telecommunications options:

Technology:Dial-up using 1200 bps modemDial-up using 9600 bps modemDial-up using 28,800 bps modemBasic Rate ISDN:
B-channel type (bearer channel)
D-channel type (data channel)
H-channel type
+ several channel combinations such as 2B+D, etc.T-1T-3 ATM-SONET
(OC-3 rated)ATM-SONET
(OC-12 rated)Data Transmission Speed in kbps or M/bps1.2 kbps to 2.4 kbps9.6 kbps 28.8 kbpsB: 64 kbps
D: 16 kbps (only control information)1.544 Mb/s44.736 Mb/s155.25 Mb/s622.08 Mb/sData Transmission Speed in bps1,200 bps9,600 bps 28,800 bps2B+D: 128,000 bps1,544,000 bps44,736,000 bps155,250,000 bps622,080,000 bpsTime to transmit digitized version of the 32 volume New Encyclopedia Britannica28 days at 1,200 bps 3.5 days (84 hours) 28 hours6.3 hours (at 2B+D ISDN service level rated at 128 kbps). 31 minutes
1 minute17 seconds4.7 seconds
Clearly, the options on the left side of the table will rapidly become increasingly unacceptable. Comparing the evolution of computing power with the evolution of the ability to rapidly transmit the data using telecommunications innovations, the need for a modern, high speed electronic highway is evident. But where is Utah right now with respect to infrastructure, management, and services available on the Utah's electronic highway?

Telecommunications technologies are rated in terms of the speed with which they can transmit analog or digitized signals (voice, computer data, images, etc.). As a starting reference point to understanding different speeds, most telephone connections are analog and use conventional "twisted pair wires". This technology is capable of maximum data transfer speeds of 3,000 (.003 Kbps) to 33,000 bits per second (.033 Kbps) over the public telephone network using analog transmission technology. Digital technology (0's and 1's) offers substantially higher alternatives.

"Multiplexing" is the process of combining one or more circuits or lines to increase transmission capacity and speed. In North America, the standard multiplexing (combination) hierarchy used with digital network channels are:

B-channel type ISDN line (bearer channel type)64 kbps
(.064 Mbps)One 64 kbps digital circuit.D-channel type ISDN line (data channel type)16 kbps
(.016 Mbps)This is a control channel needed to transmit ISDN data and is used in combination with a B channel digital circuit. For example, a 1B +D ISDN lines transmits 64kbps data and needs the 16 kbps control channel to accompany it.Common ISDN service level sold by public providers is ISDN 2B +D, also known as "Basic Rate ISDN".128 kbpsThis is created by combining two 64 kbps digital circuits (2 x 64 kbps = 128 kbps), plus the necessary control channel (the control

channel does not provide additional bearing capacity so it is not included in the rated service).

For definition purposes, this is also the differentiation level between "narrowband" and "broadband" telecommunications speeds, with speeds higher than 128 kbps considered to be "broadband ISDN", those at 128 kbps or less to be "narrowband ISDN".H-channel type ISDN line384 kbpsThis is a higher capacity type of digital line (6 x 64 kbps = 384 kbps).

(This is also the transmission speed of the new Hughes Network Systems DirecPC digital satellite data transmission service to be available in early 1995 to Utah homes and businesses.) Fractional T1 (also known as FT1)Less than T1This is any combination of the above described 64 kbps digital lines less than 24. T1 1.544 MbpsTwenty-four 64 kbps digital circuits.T2 6.312 MbpsFour 1.544 Mbps T1 digital circuits.T3 (also known as DS3) 44.736 MbpsSeven 6.312 Mbps T2 digital circuits.T4274.176 MbpsSix 44.736 Mbps T3 digital circuits.

With a new generation of broadband digital transmission technology, ATM / SONET, a new rating scheme is used. The ATM / SONET technology is explained below.

ATM / SONET Group:Synchronous Optical Network (SONET) is a protocol standard for using fiber optical networks. The SONET standard is defined in terms of Optical Carrier (OC-) speeds (OC-1 thru OC-240). To calculate the data transmission rate, all OC rates are multiples of 51.84 Mbps. If the backbone of the network transmits data at OC-48, it operates at: 48 x 51.84 Mbps = 2,488 Mbps or 2.4 Gbps (another way to express the same number).51.84 MbpsSTS-1 / OC -1155.52 MbpsSTS-3c / OC-3622.08 MbpsSTS-12 / OC-122,488.32 MbpsSTS-48 / OC-48

Types of Networks

Electronic devices can be connected directly to each other, known as a "point-to-point network". If your home telephone was connected directly to your neighbors telephone, it would be a point to point network.

Alternatively, electronic devices can be connected to a central collection and message redistribution point, called a "switch", which also moves traffic to other network switches connected to other electronic devices. These are known as "circuit switched networks".

Computer file messages to be transported over a network are usually too large, so they need to be divided into smaller parts of the overall message. These smaller message parts are known as "packets". So that each packet knows where it should be going, it includes an address. To keep the packets organized so that they can be re-assembled into the overall file message, each packet is numbered for easy re-assembly into the correct order at the destination point of the message's travel.

When the use of "packets" was combined with a "switched network" as described above, it became known as a "packet switched network". When these were first implemented, they were not of very good quality. So, to compensate for lost, inaccurate, or misdirected packets, the telecommunications geniuses added methods to detect when errors in the data transmission occurred, called "error detection". It doesn't do any good to just know that an error occurred, there should also be a way to correct the error that occurred. So, the telecommunications geniuses added "error correction". After they added all this stuff (packet numbers, packet addresses, packet error detection, and packet error correction) to the original data that was being sent, a lot of overhead was added to the transmission load. But, because the quality of transmission lines was poor, it was necessary.

Next, the telecommunications geniuses went to work on improving the quality of the transmission lines. They were successful. Looking back at what they had created, they noted all the overhead that had been added (packet numbers, packet addresses, packet error detection, and packet error correction) when the transmission lines were of poor quality. However, the transmission lines were now of much higher quality, so the telecommunications geniuses decided to strip away some of the data transmission overhead, specifically the error detection and correction overhead included in each packet. Next, a name was needed for this type of network. Was it going to be called "packet switched network without error detection and control"? No, because it was time to confuse everybody with new terminology, so they called it a "frame relay network". Frame relay networks also transmit data segments in groups instead of at the individual packet level. These groups of data are called "data frames" Frame relay can accommodate transmission speeds up to 2 Mbps, although it is most commonly offered as a multiplexed 1.544 Mbps service by public telecommunications providers (such as US West).

When packets are sent through a network, sometimes the packets could be delayed if too many packets arrive at the switch at the same time. One way to minimize the effect of this is to send the packets faster, and this type of network became known as a "fast packet switching" network. A frame relay network also utilizes fast packet switching technology and "packets" that can be different sizes.

If the packets are all made to be the same fixed size, instead of calling them "packets" they are called "cells". The service of moving these types of message units is called "cell relay service" (CRS).

In a vacumn, light can travel at 186,000 miles per second, which is very fast. Since digital transmission of 0's and 1's can be expressed the same as a light "on" and a light "off", the use of light as a transmission medium works very well. A "fiber optical network" transmits digitized data signals using light that is transmitted through fiberglass. A fiber optic cable consists of clear fiberglass covered by insulation to preclude loss of the light signal, plus devices to make light reflect correctly around corners, since cables cannot always be installed in a straight line. So, as a transmission medium, fiber optics is an excellent transmission medium for digital telecommunications.

"SONET" is a set of international standards for digital transmission using fiber optic facilities. These standards define the optical performance specifications, transmission rates, signaling techniques, and multiplexing techniques that form a basis for SONET standard compatible products. The term "SONET" is also used to describe the transmission equipment that was developed to comply with the SONET standards. SONET is an acronym for Synchronous Optical Network.

"ATM" is a high technology method of "switching" the transmission of high speed digitized data. "ATM switches" accomplish this. ATM is an acronym for Asynchronous Transfer Mode. ATM's most important feature is its "flexible bandwidth allocation" methodology. ATM uses "packet switching technology" but with fixed size "cells" instead of variable size packets.

A "SONET / ATM network" incorporates both the above technologies in a state of the art, high speed, digital network capable of providing integrated services such as voice, data, still and moving images, etc.

SONET /ATM technology has been under development and testing for a long time. In the mid 1980's, ATM technology was developed and refined by Bellcore Labs, the research unit of the Bell telephone companies. Next, the SONET/ATM technology was implemented into equipment developed by international companies, such as Fujutsu, Ascom Timeplex, AT&T, SynOptics, and many others. In 1991, the US government passed the High Performance Computing Act to foster creation of high speed networks. The Corporation for National Research Initiatives received a $15.8 million federal grant for testing high speed networks. At least 12 national telecommunications service providers got together and created 5 test-beds for SONET/ATM technology and equipment. These test-bed projects were (1) the "Aurora Project" by Bell Atlantic, MCI, and NYNEX; (2) the "Blanca Project" by AT&T and several others; (3) the "Casa Project" by MCI, Pacific Bell and US West; (4) the "Nectar Project" by Bell Atlantic; and (5) the "VistaNet Project" by BellSouth and GTE. (The VistaNet Project is what gave North Carolina the first SONET/ATM network in any state.) These occurred in the early 1990's. The study and homework has been done on SONET/ATM technology and equipment. The industry ATM technical standards have been under development for the past nine years. In 1993, the International Telecommunications Union - Telecommunications Standards (ITU-TS) group and the ATM Forum group reached and published final agreements on ATM networking standards in 1993. This included inter-carrier interface standards for using ATM services between telecommunications providers. Once these agreements were reached, product vendors could then move forward with end-user ATM products and wide-spread market introduction in 1994. Now, the public telecommunications network providers are enabled to provide the necessary hardware, software, and other services needed to implement a high speed, broadband digital ATM protocol based network in Utah.

In the research labs, the next generation of telecommunications technology, known as "photonic switching", is currently being developed. As of November 1994, photonic switching technology is at about the same stage as SONET-ATM technology was in 1986, or 8 to 10 years from implementation by industry based on recent experience with ATM's development life cycle. So, if the ATM technology is deployed in Utah in 1995, it may be the best technology available until about the year 2003 to 2005.

Utah's objective for an electronic highway is to implement a technology environment that will:

1. Deploy a single broadband network platform that can support a variety of services (data, video conferencing, audio, etc.).
2. Minimize capital expenditures and operations costs.
3. Assure its citizens and business community that Utah provides a competitive, cost efficient, state-of-the-art telecommunications infrastructure.
4. Eliminate possible duplicate transmission and switching facilities and other expenditures.
5. Be implemented while still protecting the invested base in information systems, computer hardware, training, etc.
6. Accomplish all this while still maintaining the concept of "universal access" for all Utah citizens and "reasonable and affordable rates".

Asynchronous Transfer Mode (ATM) is the electronic highway technology that should meet these criteria and provide the high speed, high capacity (high bandwidth) needed to for the high demand applications emerging in the public and private sectors.

The next ingredient needed for the electronic highway capital investment initiative to move forward was an economic incentive. The driving economic incentive for the public telecommunications providers is video-on-demand entertainment programming services. Now, with the telecommunications providers willing to invest the needed dollars to install an ATM network, state government can also afford to be a participant in the high performance, digital, broadband ATM network.

Personal Computer Penetration in Utah

Dan Jones and Associates polled Utah citizens in December 1994 and determined that 51% of those polled own a home computer. Per households estimated by the 1994 Bureau of the Census, Utah has approximately 599,000 households. So, if 51% of 599,000 households own a home computer, there should be approximately 305,490 home computers in Utah. Of those that indicated that they use a home computer, they use it for the following:

48%	Entertainment.
59%	Business
66%	School
59%	Family Record Keeping
8%	Other unspecified uses

The Dan Jones survey also determined of those that did not currently own a home computer, 53% plan to buy a computer in the future. So, of the 49% of Utah households that do not already have a home computer, approximately another 155,560 plan to purchase one in the future, bringing Utah's total home computer market to about 461,050 households, or three of every four Utah households.

Evolution in Personal Computer Operating Systems (Microsoft, Inc.)

Personal Computer Operating Systems will continue to evolve. For example, Microsoft Corporation, the dominant force in PC operating systems introduced the Windows 95 operating system on August 25, 1995. Microsoft also offers other operating systems, such as Microsoft Windows NT Server (currently version 3.51) and Windows NT Workstation. Microsoft's DOS / Windows 3.1x PC operating systems will also be extensively used until upgraded. Microsoft will market two personal computer operating systems, Windows 95 and Windows NT (both a Server and Workstation version of Windows NT). In 1996, following the hardware product cycle, Microsoft will release Windows NT version 4.x (also known as "Nashville"). In 1997, Microsoft will introduce Windows 97. In 1997, they will also release Microsoft "Cairo", also to be known as Windows NT 5.0. In 1998, Microsoft will release Windows 98, following the hardware product cycle of Intel's P7 microprocessor. Then, the big change will occur in 1999, as Microsoft plans to merge their two operating systems (Windows 98 and the "Cairo" version of Windows NT) into a single, new personal computer operating system.

Evolution in Computer Network Operating Systems (Novell, Inc.)

Novell's plans to concentrate in network operating systems will build on the current version of their Novell NetWare 4.x. In 1996, Novell will release their "Green River" version of NetWare (NetWare 5.x). In 1997, Novell will release the "Moab" version of NetWare (NetWare 6.x). In 1999, Novell will release their "Park City" version of NetWare (NetWare 7.x). Concurrently with this occurring, Novell will integrate NetWare connectivity into many other types of personal electronic devices (televisions, telephones, computers, etc.).

Evolution in Computer Network Operating Systems (Netscape Communications, Inc.)

A major new player in the network operating system market is Netscape Communications. Netscape will probably provide some Internet based network operating systems in the near future.

Government does not build an electronic highway, this is a function of the private sector. Government has a different role. A successful implementation of an electronic highway and it's use by state government, requires several concurrent initiative components:

1. The physical infrastructure of the highway: This is the large high speed, high capacity backbone, the smaller feeder lines, and the end point interconnections of devices into the offices, businesses, homes, and others being served. This will be built by the private sector.

2. Changes to the governance structure and other laws that effect the ability of private industry to get the job done.

3. Changes in the way business is conducted, both government, private enterprises, not-for-profit entities, Utah's citizens, schools, universities, health care providers and payers, etc.

4. Utah's citizens next must be willing to take a drive on the new electronic highway. When a new freeway is opened, one must first boldly turn onto the on-ramp for the first time to participate in the new benefits. The electronic highway will require the same. Some electronic highway services have been available for years. Utah's citizens need to be motivated to use electronic highway services. State government has also accepted this role to motivate Utah's citizens to use electronic highway services. Hopefully, this document will inform Utah's citizens of electronic highway services that will improve our quality of life. Our economy will also benefit as a result.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Design and install a high speed ATM / SONET network backbone. The high volume traffic portions of the network backbone will be OC-48, the lower traffic network backbone portions will be OC-12 or OC-3.

Expected Benefits

SONET / ATM is the most advanced generation of networking technology currently available for installation and is expected to offer future service levels up to 160 Gigabits per second, or 160,000,000,000 bits per second transmission speed. The OC -48 network backbone will provide 2.4 Gbps, or 2,488 Mbps, or 2,400,000,000 bits per second transmission speed, a similar level of network service as is currently being offered by the most advanced network in any state [North Carolina's Information Highway (NCIH)].

Utah's ATM/SONET OC-48 initiative will assure Utah's infrastructure remains competitive for businesses considering locations within Utah.

Who is Responsible

Governor's Office and the Division of Information Technology Services.

Status as of December 1995

In-Progress: The Governor's Office / Division of Information Technology Services issued to the public a request for Proposal for this in August 1994. Responses to the RFP were due back and received from telecommunications providers on December 13, 1994. Nine telecommunications service providers submitted proposals which include cost estimates, projected installation and service availability dates, etc. The proposals are currently being evaluated by an RFP committee and the selection should be announced in early 1995.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

High speed, fiber optic "frame relay" network backbone for the high population areas of Utah. As per the attached map, this network backbone currently exists from Logan in the North to St. George in the South, and from Wendover in the West to Park City.

In simplified terms, the network backbone serves as the high volume, main transmission infrastructure of the overall system. (This is not the electronic highway connection to your house - see the item titled end point connection to residences).

Expected Benefits

"Frame relay" is a relatively low cost, public, packet switched, data network service designed to be a public wide area network (WAN) backbone. Transmission speeds are 64 kbps (64,000 bits per second) to 1.544 Megabits per second, or 1,544,000 bits per second transmission speed.

This is an essential part of the currently existing physical infrastructure for Utah's electronic highway in the high population areas of Utah.

Who is Responsible

US West (1-801-575-1070) / Independent Telco Association of Utah

Status as of December 1995

Currently Available for Use: US West has invested $141.3 million and the frame relay network is completed from Logan to St. George and from Wendover to Park City. (The Provo to St. George portion was completed in 1994 and is indicated by another line on the attached map.) The 12 independent telephone companies have invested another $116 million in this infrastructure.

Utah state government presently has approximately 125 frame relay access links throughout the state.

The Status of Utah's Electronic Highway Infrastructure

The Status of Utah's Electronic Highway Infrastructure

(Colleges & Universities, Government Offices, Schools, and Libraries)

Executive Summary of Service / Initiative

Implement end point connection to the state's fiber optic wide area network (WAN) backbone for:
1. 733 public schools (high schools, junior high schools, middle schools, special schools, alternative schools, and elementary schools).
2. State government offices.
3. Utah's 9 public higher education facilities - the colleges and universities.
4. Local government offices (cities and counties).
5. Utah's 52 public libraries.
6. Utah's health care facilities and third party payment providers.

Expected Benefits

End point connection provides the electronic highway to the building where it can be connected to the local area network server(s) or other devices.

Who is Responsible

Governor's Office / Division of Information Technology Services (ITS) / and an as yet undetermined telecommunications service provider(s) - see below.

Status as of December 1995

Currently Available for Use: Utah's state government currently has 12,313 work stations, capable of sending / receiving electronic mail (and other functions) using WordPerfect GroupWise, connected to the state wide area network. Others, such as college and university e-mail addresses are accessible via Internet.

In-Progress: In August 1994, the Governor's Office and the Division of Information Technology Services (ITS) issued to the public a Request for Proposal to connect the remaining sites. This RFP will cover end point connection to the state wide area network connection for public schools, libraries, local government offices, and health care providers. Responses were due back and received from nine potential telecommunications service providers on December 13, 1994. Each telecommunications provider provided their proposal for this level of service, including cost estimates, projected installation and service availability dates, etc. The RFP responses are currently being evaluated by an RFP committee and a selection should be announced in early 1995.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Implement a satellite based, digital network service, called DirecPC, that will provide a high speed data communications capability to Utah homes and businesses.

Hughes Network Services DirecPC service is a digital network that is satellite based and will provide high speed (12 Megabits per second) digitized transmission capability to Utah homes and businesses. Using a 24" satellite dish that receives a high power (120-200 watt) digital signal from a satellite transmission, consumers will receive high speed Internet access, news, periodicals, and access to other networks, for $15.95 per month, plus the initial hardware acquisition costs. Initial hardware needed by consumers will cost, depending on volume purchase discounts, from $ 764.05 to $1,295 per user. This will include the 24" satellite receiving dish, antenna, LNB, a personal computer adapter card, and the DirecPC Windows based software.

This system operates as follows: First, DirecPC customers send data, video images, software, etc. or whatever is going to be transmitted from their "Information Provider Computing Platform" to the DirecPC Network Operations Center (NOC). The NOC is the satellite system "uplink" facility, and is located in Germantown, Maryland. The digital signal is transmitted to the Hughes Network Systems satellite in geostationary oribit. The satellite's transponder re-transmits the digital signal back to earth, which is received on customer's DirecPC Access Kit (DAK). The DAK (the "downlink") consists of a 24" satellite dish with an LNB which collects the signal, the coaxial cable which becomes the transmission medium of between the LNB and the personal computer; and the ISA adapter card which has been installed in the customer's personal computer to interpret the signal so the PC can use it. The personal computer communicates back to the DirecPC Network Operations Center using a 9600 baud modem and conventional telephone lines, which completes the linkup cycle. The personal computer also has DirecPC software installed, which has a Windows graphical user interface and Windows style icons which are already familiar to Microsoft Windows users.

Expected Benefits

1. Consumers will have a high performance (400 kbps), low cost Internet data access capability for their homes.
2. Software vendors, such as IBM, will have a low cost product distribution network where updates will be sent to KIOSKS in retail outlets, businesses, and consumer locations that have been enabled with this service.
3. Information distributors will have a high speed distribution method for periodic information distribution, such as periodical issues, news, etc.

Who is Responsible

Hughes Network Services (Tom McPherson, Vice President or Jack Malone, Senior Director, e-mail to "jmalone@HNS.com").

Status as of December 1995

Currently Available for Use: Hughes Network Services launched their DirecPC satellite into orbit in April 1995. This service, and hardware products are expected to be available in mid 1995. (Hughes Network Systems has already made available to consumers a similar 150 channel satellite based TV program service and this is an expansion into the digitized data market sector - the RCA DSS service).

The Status of Utah's Electronic Highway Infrastructure

Electric Lightwave, Inc. currently has fiber optic cable service available in various parts of the Salt Lake City area. ELI's fiber optic cable service in the Salt Lake City area is from 400 North to about 7800 South, eastward from the University of Utah area and westward to about the Salt Lake International Center near the airport.

(For Video-on-Demand or 500 Channel TV)

There are several possible technologies for telecommunications providers to provide high bandwidth video-on-demand service to Utah's homes and businesses. Most Utah homes have an existing infrastructure of copper twisted-pair wires that have been providing telephone services for years. Many Utah homes also have an installed infrastructure of 75 ohm coaxial cable into their homes, if cable TV service has already been wired into the residence. Several technology options currently available are: (1) Switched Digital Fiber to the Home (FTTH), or (2) Switched Digital Fiber-to-the-Curb (FTTC), or (3) Switched Digital Hybrid Fiber-Coax (HFC), or (4) Asymmetric Digital Subscriber Line (ADSL). Each of these technologies is described below:

This technology uses fiber optic throughout the switched network, including fiber optic cabling directly into the homes or businesses.

Switched digital fiber-to-the-curb (FTTC) has huge capacity and can be deployed selectively and then expanded. Switched digital fiber-to-the-curb (FTTC) provides video programming and information from providers in a digitally compressed Motion Picture Expert Group (MPEG) format that is transported digitally by fiber optic equipment to the central office. The digital video signals from all providers are combined on a video distribution device called a Host Digital Terminal (HDT). Fiber connects the HDT to the pedestal. Coaxial cable carries the signal from the pedestal to the home. Only programs requested by the subscriber are transmitted.

Switched digital hybrid fiber-coax platform has cost advantages over switched digital fiber-to-the-curb. Switched digital hybrid fiber-coax combines properties of fiber and coaxial architectures and can combine 100 or more analog channels using a bus architecture. It uses a tree and branch structure to allow many customers to access the same information, reducing demands on the transport medium as compared to a switched star type architecture. HFC technology uses a linear analog laser transmitter that converts the radio frequency (RF) electrical signal into an optical signal. The optical signal is then split and transmitted over multiple fiber channels in the feeder network to an optical node. At the optical node, an optical receiver converts the signal back to an RF electrical signal. This electrical signal is then amplified and broadcast over a large diameter coaxial backbone cable. The signal is delivered to individual subscribers using taps and coaxial cable drops (like cable TV uses) . The customer can choose their own interactive multimedia programs. As demand for interactive multimedia applications increases on an HFC technology network, telecommunications providers will probably be forced by customer demand move to switched digital fiber-to-the- curb (FTTC), so at best this technology offers an interim solution.

ADSL permits multiplexing and transmission of a one-way, 1.544 digital signal along with plain old telephone signals (POTS) or basic rate ISDN signal, and a two-way signaling channel on an integrated basis over single non-loaded copper pair. The ADSL technology should be available in 1995, at channel rate of 3 Mbps to 6 Mbps over a single twisted copper pair (wiring). An ADSL central office unit works with an ADSL remote terminal located at the customers premises. The remote terminal separates the POTS or ISDN signal from the compressed video signal. The POTS signal is transported over standard customer premises wiring. The broadband portion of the signal is delivered via standard twisted pair copper facilities to a set top terminal. ADSL can be installed one customer at a time.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

In February 1993, US West announced a $13.2 billion, 14-state plan to build a high capacity broadband "electronic highway" that can carry interactive video, cable television, and data. In March 1994, US West announced their "Mass Market Broadband Services Initiative". This initiative is a $160 million Phase I start of their electronic highway end point connections in the Utah market. The initial project will involve 160,000 homes and businesses in western parts of Salt Lake City and West Valley City, as indicated by the attached map. (The area was selected to be first based on economic and market surveys by US West that focused on identifying those customers most inclined to use multi-channel, cable TV viewing services.)

Expected Benefits

This service from US West will allow connection of homes and businesses to the electronic highway and implement video on demand service, which US West calls "multimedia". US West has several options to implement higher bandwidth for end point connections to Utah's homes and businesses. These options are:

* Switched Digital Fiber-To-The-Home (FTTH) technology. This is fiber all the way into the homes, which may not be practical or cost effective
* Switched Digital Fiber-To-The-Curb (FTTC) technology, which will provide Utah customers with the greatest bandwidth of these options, at less cost than the FTTH technology which was previously described.
* Switched Digital Hybrid Fiber-Coax (HFC) technology. If US West implements this technology, the capacity will be limited and this will probably be an interim solution until US West decides to upgrade to FTTC technology.
* Asytmetric Digital Subscriber Line (ADSL) technology, which is a much slower 1.544 Mbps digital signal (this is T-1 speed) but can be transported over the existing infrastructure of twisted pair copper wires.

US West's management decided to use a hybrid combination of Switched Digital Fiber-to-the Curb (FTTC) and Switched Digital Hybrid Fiber-Coax (HFC) technologies in the Utah market. This project will enable US West to provide the following services: Broadcast television; Premium cable; Pay-per-view events; Movies-on-demand; Interactive games; and Interactive home shopping.

Who is Responsible
US West Communications (Kevin Taylor, Marketing Manager - Advanced Technologies 801-575-1070)

Status as of December 1995

In Progress: On March 16, 1994, US West announced this initial $160 million first phase of the high bandwidth fiber end point installation program to connect businesses and residences to the electronic highway in Utah. This initial phase includes 160,000 residential and business customers in the Salt Lake valley area. As of December 1994, US West has not issued their RFP for this project, and expects to actually begin installation and connections into homes and businesses in 1996.

Note: On June 1, 1995, US West filed for FCC approval to discontinue this project in Salt Lake City and several other small cities.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Norhtstar Multimedia Communications, Inc. has announced plans to install a ....

Expected Benefits

Who is Responsible

Status as of December 1995

The Status of Utah's Electronic Highway Infrastructure

Internet is a world-wide network of interconnected networks of computers. As of November 1994, Internet consists of 48,000 different computer networks that include approximately 20 million computers. This very brief description of Internet services which follows is intended to be a high level overview and description of Internet and how it works. If you want to know more, many excellent books are available in bookstores and libraries.

Electronic mail allows Internet network users to send messages to each other by computer. Electronic mail, or email as it is commonly known, is the most popular and widespread Internet network facility and is used by millions of people. It is popular because it is fast, convenient and cheap. This is particularly the case for keeping in touch with colleagues around the world because it avoids the high costs or time delays of telephone, fax, and conventional mail.

Documents already in electronic form can be sent by electronic mail, provided they are put into plain text format. For instance coauthors might exchange drafts of their paper using email.

One of the most versatile features of email is the easy distribution of one message to many people, simultaneously. This facility is used for electronic mailing lists, newsletters and journals. It can also be used for distribution of information relating to meetings or conferences, or in fact, circulation to any ad hoc grouping of email users.Gopher is an Internet menu system for organizing files on the Internet that was originally created by the University of Minnesota (their athletic teams are called the Golden Gophers).

Gopher allows you to browse through menus of Internet network resources and retrieve items which you select. If using a Windows type Internet interface, such as Winsock Gopher, the user simply clicks the computer mouse button and the Gopher menu item is accessed, and placed on the users screen or the file can be saved on the users personal computer hard disk. Gopher menus bring together information distributed all over the network, and may include many types of network resources, e.g. text documents, image or sound files, index searches, or telnet sessions.

Gopher can be used as a lookup tool allowing the user to search through menus organized by subject, location, or other means which represent the holdings of thousands of servers via hierarchically arranged menus. The user can browse and make selections. When the Gopher user locates a desired document, gopher retrieves it and gives the option to either view the document, save the document to your hard disk, or both. You don't need to know where the document is actually located because gopher will take care of the file transfer from wherever in the world the item is located on someone's Internet server. If different Internet servers around the world have documents on a similar subject, Gopher provides a method to easily bring the information together by subject, location, or other method.If you have no idea if or where a file may be on the Internet or if a file on the topic exists, and you do not want to search thousands of gopher menus to find it, Veronica is the tool to electronically do the search work for you. Veronica is an electronic method to conduct "keyword searches" of title items in Gopher menus. Veronica provides a shortcut to take you directly to the required point in Gopherspace, avoiding the necessity for working through hierarchies of menus. For example, if you are searching for a document by its title, using Veronica, an Internet user can type in the name and Veronica will electronically search all gopher files and locate the document for you. Then you can use Gopher to view or save the file. Jughead is a utility similar to Veronica except that rather than searching through all of the Internet gopherspace in the world Jughead searches only through the documents contained on the local server, such as only the University of Utah's Internet server.USENET News is a worldwide system for exchange of information. It works a little like a mailing list, except that messages, instead of being sent to individual mailboxes, are posted to the News service. Users log on to a computer at the local site which hosts the News service.Mosaic is a graphical user interface (like Windows) to the World Wide Web (WWW). With Mosaic you can access quite a bit of the information contained on the Internet. Mosaic is the WWW browser supplied by the National Center for Supercomputing Applications (NCSA). There are, however, other browsers available on the Internet, some which support graphics mode and others which use only text mode. At this time Mosaic is the most common browser available, running in the MSWindows, Macintosh, and XWindows environments.Netscape is a graphical user interface similar to Mosaic (previously described), but Netscape is more advanced than Mosaic. (WWW)WWW is a distributed hypermedia information system in which you can access thematically (the stem of a word) related networked information, regardless of where it is held. Hypertext (or hypermedia) documents are related to each other through 'linked' words. By selecting a 'linked' word which you would like to know more about, a hypertext system will present you with related information. With WWW, the web of links spans documents all over the globe and many types of media. World Wide Web works by establishing hypertext links between documents anywhere on the network, including if you like, your own files. A document might include many links to other documents held on many different servers. Selecting any one of those links will take you to the related document wherever it is. (WAIS)WAIS is an electronic search and retrieval system, wherein the contents of documents at specified WAIS servers are searched for the occurrence of search terms given by the user. WAIS does this by searching on indexes of full text which have been generated by WAIS servers. A WAIS command is essentially: "find me items about this in that library". WAIS then looks at all the documents held in the sources you nominated, and tells you which documents there are most likely to contain what you want.Telnet is the protocol used to connect to a host computer. When you connect to a remote host with telnet you can work on that host as if you were working on your local computer. (FTP)FTP (file transfer protocol) is the Internet method of file transfer, fast becoming the de facto standard everywhere. With file transfer protocol (FTP), you can send documents in both binary and text format. This gives one important advantage over email. Many types of files can easily be transmitted without the need for conversion to plain text, and the accompanying risk of error. Wordprocessed documents, computer programs, image files, and other binary files are no more trouble to send than plain ASCII files.

Anonymous FTP is a means of providing general access to archives of online information. The standard requirement of user name and password for file transfer normally restricts access to online files to registered users only. However, anonymous FTP gets around this restriction and makes online information resources virtually open access. All that is required is to know the conventional login, which is usually published or can be learned using electronic mail or Archie (the next Internet tool described).Archie is an electronic search method to search listings of anonymous FTP archives. You can use Archie to search for a term either a filename, or part of a filename. An Archie search will return you a list of matches for your search term and include all the information required for anonymous FTP retrieval.

The Status of Utah's Electronic Highway Infrastructure

The Status of Utah's Electronic Highway Infrastructure

Telephone NumberBBS NameBaudBBS Networks Offered801-250-5029The OutWest BBS2400 - 14400 Beehive801-250-8343Draco Ordo14400Fido, Virtual, Utah801-255-8909Vital Signs14400Fido, Healthcare801-261-1174Spectra Sound14400Sonic801-269-0939The Rift2400 - 14400WWIV, Kobran, Beehive801-277-4815The Far Side1200 - 28800Physco, LW, Screw801-277-8575Gamers Edge14400Intelec, Pen, Doom, ILink801-278-2699Lies Unlimited300 - 14400Nirvan, Fido, Yoyo801-280-8443Share City2400 - 14400Rime, LDS, Inter801-281-4146Imperium of Darkness14400Beehive, WWIV, Ice, Terra801-288-2195Feeger's 14400SL801-359-0925Your Roots14400Fido801-486-0929The Iron Grid300 - 38400Fido801-486-6397Expresso Yourself16800WWIV, Ice, Gay801-486-8582Sanctuary14400Curcuit801-486-8833Mexnet2400 - 28800Internet801-487-2432Just Another BBS14400Beehive, Your801-538-3383State of Utah BBS1200 - 14400801-539-0900XMission14400Internet801-567-0036South Valley BBS14400Fido, Livewire, Beehive801-567-9560Alternet14400Internet, Usenet801-571-1489Funet2400 - 14400SL, Fido, Hell801-572-2662Plum Crazy14400Plum, Share801-596-7350Planet Reisa2400 - 14400Fido, Lace801-963-0491Graphic Connection2400 - 14400Ilink, Utah801-963-1625FaNtAsiA14400Beehive801-963-4660Digital Illusions2400 - 28800Beehive, Digital, Dove801-964-9560Hot Bauds14400WW4, Search801-966-2533The Rainbo Spiral1200 - 14400Wild, Gamers, RPG, Beehive801-966-6270The Privy Ledged14400Wild, Beehive, Rime, RPG801-967-6883Lone Peak14400SL, LDS, Beehive801-967-6883The Last Resort14400Beehive801-969-5886Fovea Centralis14400Fido, SL801-975-7156The Starship BBS14400Beehive

The Status of Utah's Electronic Highway Infrastructure
Large National & International Networks

Executive Summary of Service / Initiative

Novell's Netware Connect Services (NCS) is a technology enhancement to Novell Netware which will allow the currently existing 2.5 million local area networks to interconnect, using ANCS services from American Telephone and Telegraph (AT & T).

Expected Benefits

Who is Responsible

Status as of December 1995

AT & T / Novell will provide ANCS service subscriptions starting in December 1995.

The Status of Utah's Electronic Highway Infrastructure
Large National & International Networks

US West Telecommunications, Inc. and Novell, Inc. Are jointly developing !NCS, known as Inhanced Network Communication Services.

SMARTUTAH will be a business partner with both !NCS and ANCS.

US West plans a beta test of INCS in the July - August 1995 time frame within Utah.

!NCS will have a dial-up component which will be toll free state-wide, allowing rural Utah areas equal access with Utah's metropolitan areas.

Executive Summary of Service / Initiative

Expected Benefits

Who is Responsible

Status as of December 1995

The Status of Utah's Electronic Highway Infrastructure
Large National & International Networks

Executive Summary of Service / Initiative

Microsoft's new Windows 95 personal computer operating system product will be commercially available August 25, 1995. Each user of Windows 95 will have included with the operating system a built-in graphical user interface into a telecommunications network from Microsoft, known as the Microsoft Network. To connect to the Microsoft Network, users of Windows 95 will simply select an icon from within Windows 95, just like as if selecting word processing, spreadsheet, or other application software services. This methodology will allow users easy, consistent, and graphical functionality to network services, which will include:

1. Bulletin boards.
2. Download libraries.
3. Electronic mail, including allowing message management at your local storage device (hard disk).
4. Chat services for real time conferencing.
5. Viewable files at various sites accessible on the Microsoft network.
6. Downloadable files at various sites accessible on the Microsoft network
7. Internet access, including Internet electronic mail and news group services.
8. shortcuts to these various services and electronic sites, including allowing users to embed shortcuts into electronic mail messages, word processing document, spreadsheets, etc. This way, a reader simply clicks on the "embedded shortcut" and is immediately at the predetermined electronic site.

In addition to the above, providers of services will be able to become electronic information sites and receive compensation via the network for information or services provided, goods ordered, etc. To become a Microsoft Network "service(s) access site", a provider contracts with Microsoft and submits a content provider business plan. Approximately two months later, they can be up and running as a provider access site on the Microsoft Network.

Expected Benefits

For the user, a consistent, easy to use graphical interface should make electronic networking services more available. "Easier to use" is expected to translate into "used more", when referring to telecommunications networking services such as BBS, Internet, etc. Microsoft Corporation estimates that 75 million people will ultimately purchase the Windows 95 product, creating a potential very large network. (Current estimates are 20 million people use Internet.)

Who is Responsible

Microsoft Corporation, Dept. MSN19, One Microsoft Way, Redmond, Washington, 98052-6399

Status as of December 1995

The Microsoft Network is currently in beta testing, and is expected to be available in September 1995.

The Status of Utah's Electronic Highway Infrastructure
Large National & International Networks

Executive Summary of Service / Initiative

The Federal Reserve System is the nation's central banking system, which interfaces with the central bank(s) of other nations throughout the world. The Federal Reserve is the bank for financial institutions and the United States Treasury Department. Utah's financial institutions (commercial banks, savings and loan associations, credit unions, mutual savings banks, and thrift institutions) participate in several telecommunications networks that are designed to handle financial transactions. These include:

* FRCS-80 - Federal Reserve Communication System 80 - The communications network of the Federal Reserve System which interconnects Federal Reserve Bank offices, the Board of Governors, depository institutions, and the Treasury. It is used for Fedwire transfers, transfers of U.S. securities, as well as for transfer of Federal Reserve administrative, supervisory, and monetary policy information. This telecommunications system processes hundreds of billions of dollars in financial transactions per day.

* FEDNET - The new communications network of the Federal Reserve which will replace FRCS-80 in 1995.

* BANKWIRE / CASHWIRE - An electronic communications network owned by an association of banks and used to transfer messages between subscribing banks. Bankwire also offers a clearing service called Cashwire that includes a settlement facility.

* ACH - A computerbased clearing and settlement operation, often operated by a Federal Reserve Bank, established for the exchange of electronic transactions among participating depository institutions. Such electronic transactions can be substituted for paper checks used to make recurring payments such as payroll or preauthorized insurance premiums. The U.S. Treasury uses the ACH extensively to pay certain obligations of the government.

* FEDWIRE - The Federal Reserve funds transfer system. Fedwire is used for transferring reserve account balances of depository institutions and government securities. Fedwire is also used for the settlement of other clearing systems, such as CHIPS. CHIPS , the Clearinghouse Interbank Payments System, is an automated clearing system used primarily for international payments. This system is owned and operated by the New York Clearinghouse banks. It engages Fedwire for settlement

Many financial transactions do not clear through the Federal Reserve's communications system. Instead, these types of transactions clear directly between one financial institution to another, or between commercial businesses and clearing houses, using telecommunications systems between them which bypass the Federal Reserve system's communications network(s). Still other types of business transactions bypass financial institutions altogether by clearing directly between business units, such as a gas station credit card transaction being transmitted to the petroleum company's credit center, using telecommunications links between them.

The Status of Utah's Electronic Highway Infrastructure
Large National & International Networks

Executive Summary of Service / Initiative

Expected Benefits

Who is Responsible

Status as of December 1995

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Installation of public telecommunications provider equipment needed to enable Integrated Services Digital Network (ISDN) service to Utah homes and businesses. ISDN is a telecommunications service that carries voice, data, and images over the same line.

1. ISDN Basic Rate Service (BRS)
   a. Voice services only: 1B + S and 2B + S (known as US West's "PC/Phone" service).
   b. Voice + circuit switched data + packet switched data services: 1B + D and 2B + D (128 kbps ISDN) (known as US West's "Integrated Desktop Communications (IDC)" service).
2. ISDN Primary Rate Service (PRS)
   a. 23B + D (23 bearer channels + 1 control / signaling channel).

For ISDN to function, the telecommunications provider (US West) must utilize Signaling System 7 (SS7) telephone switching technology in the location of the ISDN consumer. 2B +D ISDN service utilizes the currently existing twisted pair copper wiring that is already installed for voice telephone service, so re-wiring homes and businesses will not be necessary. However, changes on the "phone box" and "switches" will need to be done by US West to enable ISDN service to the local switch. From the US West local switch on, service will be provided by the US West packet switched network, so an ISDN network exists only between the customer's location and the local service provider's switch. For the consumer, to enable an ISDN connection for a personal computer, the following is needed: (1) An internal ISDN adapter card installed in the personal computer and it's corresponding software; (2) an NT1 / NT2 network terminator (if not included with the ISDN adapter) which connects at either end of the ISDN link; (3) the ISDN circuit service provided by the public telecommunications provider, (usually two 64 Kbps circuits known as 2B + D ISDN); (4) connection to the central telephone service provider switching devices (done by US West) ; and (5) similar equipment at the switch end. For ISDN enabling an analog telephone device, an ISDN terminal adapter is required to be connected to the Network Termination Device (NT1 / NT2). ISDN service is charged on a "per-minute used plus distance basis" (like a long distance call), plus a monthly fee; plus installation charges. US west is expected to announce their tariff after the first of the year. As an example of possible costs, another regional bell operating company, California's PacTel, charges $23 per month for residential ISDN, and $70 per month for commercial ISDN.

US West Telecommunications, Inc. is currently completing a business case analysis on providing ISDN services in Utah. Depending on the business case analysis results, US West anticipates that their proposal will be presented to the Utah Public Service Commission very soon. US West anticipates providing new 2B+D ISDN service (128 kbps) from Logan to the Utah Valley, and west from the edge of the Salt Lake metropolitan area and east to include the Park City area. Also, for the same geographical ISDN service area, US West anticipates providing 23B + D ISDN service (1,472 kbps or 1.472 Mb/s) to selected customers that need this telecommunications bandwidth capacity.

US West will also make ISDN network connection service available to Utah's Independent Telephone providers so that they can interconnect to the US West ISDN network backbone.

The pricing method anticipated to be used for US West's 2B+D ISDN service in Utah will be significantly different than ISDN pricing methods used in other states. Normally, ISDN service is billed to the customer at a fixed rate minimum charge per month, plus a per minute ISDN service usage fee, just like a long distance call is charged. You pay a fixed rate for basic telephone service to your home or business each month, and any additional services, such as making long distance telephone calls, are charged on a time and distance price structure. Other states bill ISDN service using a similar method: you pay a basic rate for ISDN monthly service, plus additional ISDN charges for actual usage based on a "time used and distance charge back methodology". For example, California's PacBell bills ISDN charges homeowners $23 per month (unmetered in the evening hours) for residential ISDN service, plus the per minute usage charges. Comparing monthly ISDN service costs of one ISDN service provider to another ISDN service provider, without adding in for the time and usage charges could be significantly misleading.

Utah will have a significantly different method for ISDN pricing. US West proposes to price residential ISDN service at a fixed rate per month, regardless of where within the state ISDN service is provided to, and without a charge for time ISDN services are used. This is estimated to be $50 to $70 per month for up to 200 hours of ISDN service usage per month. US West also plans to offer a measured service offering for ISDN services for those that would never require 200 hours usage per month.

Expected Benefits

ISDN service to Utah homes and businesses will allow: (1) telecommuting; (2) transferring digital images; (3) video conferencing; (4) data networking; (5) distance learning; (6) medical imaging (telemedecine); (7) point of sale; (8) business continuation services.

Who is Responsible

US West Communications / Independent Telephone Carriers of Utah

Status as of December 1995

In-progress: US West currently does not offer ISDN service within the high population areas of Utah. However, US West can implement ISDN service with some minor modifications to their existing network equipment. US West plans to offer ISDN service in Utah in July 1995 and is expected to file an ISDN service tariff with the Utah Public Service Commission in the second quarter of 1995.

The Independent Exchange Carriers of Utah also presently do not offer ISDN service, but are working to implement ISDN.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

1. Signaling System 7 (SS7) and Digital Subscriber Signaling System 1 (DSS1) service to all of Utah's businesses and homes. SS7 networks in North America include integrated services digital network user part devices (ISDN-UP) which allow for non-voice call services and intelligent network services.

   This traditional circuit switching (dial-up) telephone service is the voice / data telephone network for Utah's business community, residences, state government facilities, and others. Included within this functional category are voice, data, and FAX communications capability over regular telephone lines.

2. Implement Bellcore's Advanced Intelligent Network (AIN) telephone system capabilities in the Utah market.

Expected Benefits

1. DSS1 / SS7 service enables telephone features such as Caller ID, Call Blocking , Incoming Call Notification when the phone is already in use, Selective Call Forwarding,, Conference Calling, Distinctive Ringing, Nuisance Caller ID, etc. DSS1 / SS7 also allows electronic interface with customer computer systems / databases before calls are answered, allowing customer inquiry personnel to load customer files to workstation screens before answering incoming calls.

2. An Advanced Intelligent Network (AIN) telephone system will add features such as network-wide call forwarding (out of state) ,incoming call waiting caller identification, out-of-area (out of state) caller identification, and similar expansion of basic services included with SS7 / DSS1, only expanding them across the telephone network.

Who is Responsible

US West / Exchange Carriers of Utah / Division of Information Technology Services.

Status as of December 1995

Residences, Businesses, and other service users in Utah:

In the US, 94 % of homes and businesses are connected to the world-wide telephone network of 1 billion phones by means of twisted-pair copper wires into homes and businesses.

Currently Available for Use: US West currently markets DSS1 / SS7 services as "Custom Local Area Signaling Services (CLASS)", "Custom Calling Services", and "Digital Switched Service".

In-progress: Advanced Information Network (AIN) telephone services have been announced to Utah customers and should be available in early 1995 in selected parts of Utah. The Federal Communications Commission (FCC) authorized provision of this service to the local telecommunications providers effective April 12, 1995.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Provide Utah's citizens, government, and business community with cellular telephone coverage to include most portions of the state. Included within this functional category are:

1. Voice communications using cellular phones.
2. FAX data communications using cellular telephones.
3. The transmission of digitized computer data using cellular phones with cellular modems. Data transmission at modem to modem speeds up to 28.8 kbps (using a 28,800 bps cellular modem) is possible using cellular telephone technology and laptop computers with cellular modems. (Also included within this category are the hybrid cellular data devices which combine services into a single, specialized piece of hardware, such as those currently used by national small package delivery enterprises).

Cellular phones operate by creating small zones of coverage (called cells) serviced by a transmitter in a limited service area. As mobile users move from zone of coverage (cell) to another, the cellular system transfers responsibility for the signal to another cell area's transmitter. The complete zone of service coverage is made up of lots of these little coverage zones or cells, and this is why it is called "cellular".

Usage of cellular telephone service is charged at per minute cellular telephone rates with base charges per x minutes of service by predicted usage category. Cellular phones will work in coverage areas of other cellular phone companies (called "roaming"). Cellular phone service costs start at $29.95 per month for 30 minutes, with excessive use billed at about per $.60 per minute. As contracted usage increase, per minute usage drops in various usage category service offerings.

Expected Benefits

The expansion of cellular telephone coverage now includes most populated areas of Utah. Digitized computer data can be remotely transmitted "over the air" using cellular telephones with cellular modems from anywhere within the shaded area of the Utah map.

Who is Responsible

Cellular One / Comnet Cellular / US West Cellular /

Status as of December 1995

Currently Available for Use: Cellular telephone service is available in the areas indicated on the attached map. (The attached map was provided as a community service by Steve Baker, Salt Lake Tribune and is used with permission.)

The Status of Utah's Electronic Highway Infrastructure

The "Iridium Project"
The "Globalstar Project"
The "Odyssey Project"
The "Teledesic Project"

Executive Summary of Service / Initiative

: This is a $3.5 billion international plan, lead by Motorola, inc. to launch 66 satellites into orbit by 1998 to provide cellular telephone service to anywhere in the world. This will be accomplished by sending 66 satellites into orbit using a method that will provide coverage to every part of the planet. Costs are expected to be high: $2,500 to $3,000 per telephone handset and usage charges of about $3 per minute.

: This is a similar, but less ambitious project by a competitor of Motorola's, Loral Corporation in cooperation with Qualcomm Inc.

: This is a similar project by TRW Inc. and it's partners.

: This is a similar project by Bill Gates (Microsoft) and Craig McCaw (McCaw Cellular Communications, Inc.)

Expected Benefits

Cellular telephone coverage will be possible from anywhere on the planet, including all areas within Utah. This system will allow "leapfrogging" technology for areas that do not have land based telephone systems. Utah will benefit from this project because it will eliminate any gaps in the current land based or cellular telephone coverage zones, especially in remote areas. Also, the signal should not be blocked by canyons, valleys, and mountains since the signal transmission comes from space and not land based station signals susceptible to blockage by canyons and mountains.

Who is Responsible

Iridium Inc. (Motorola, Inc. lead) for the "Iridium Project".
Loral Corp. / Qualcomm Inc. for the "Globalstar Project".

Status as of December 1995

The Iridium Project, by Motorola: Iridium Inc., a consortium of international telecommunications companies that have invested in the project, has raised all the $1.57 billion in equity capital required for the project. The balance will be financed by debt capital. Equity investors include Lockheed, Sprint, Raytheon, McDonnell Douglas, Gernany's Berbacom, Korea's Mobile Telecommunications Corr., Brazil's Incpar S.A. Industria of Brazil, Russia's Khrunichev State Research & Production Space Center, China's Great Wall Industry Corp., Italy's Socicta Financziara Telefonica per Azioni, and a consortia from Canada, India, Taiwan, Thailand, South America, Africa, and Japan.

Currently 4,000 people are working on the project, developing antennae, ground-control infrastructure, system management software, and other project components. The US government has committed to issue low-earth orbit satellite (LEOS) system licenses for the project by January 1995. The system is expected to be operational world-wide by the end of 1998.

The "Globalstar Project": This project is moving forward, but not with the same level of success as the Iridium project.

The "Odyssey Project": This project is only in the conceptual design stages.

The "Teledesic Project": This project is only in the conceptual design stages.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Ricochet is a wireless network connection service that operates in the 902 MHz to 928 MHz range in the wireless spectrum. Ricochet service enables the interconnection of personal computers without using physical wire connections between devices. This assigned wireless frequency spectrum utilized by Ricochet technology is broken up into 162 channels of 150 KHZ each. Compared to other wireless technologies, such as CDPD, RAM Mobile Data, or ARDIS (see next pages for these), Ricochet is significantly faster compared to these others. Ricochet operates at 100 Kbps data transmission speed, compared to 19.2 Kbps offered by CDPD and RAM Mobile Data Technologies, and 4.8 kbps offered by ARDIS technology.

Ricochet service is billed at a fixed cost per month (not based on the number of messages sent / received), and this cost is currently estimated to be $29 per month per device.

Expected Benefits

One of the "wireless telecommunications technology categories", Ricochet capability will allow "through the air" transmission of digitized data. Digitized transmission of data "through the air" will allow remote business uses of computers on WANs for applications such as: E-mail, FAXing, meeting calendaring, and accessing information (databases) on all devices connected to the wide area network (mainframe computer, mini computers, LANs, etc.).

Ricochet service will allow "100 Kbps wireless connections for telecommuting" from residence locations, without usage charges, for a fixed rate of about $30 per month..

Who is Responsible

Metricom Inc. (Giselle Serret at 408-399-8200)

Status as of December 1995

Ricochet service is currently not available in Utah. Metricom plans to introduce the Ricochet service in the Salt Lake City market in 1996. Ricochet service will be provided in Weber, Davis, Salt Lake, and Utah counties. Metricom management indicated that they could implement Ricochet service in Utah earlier if they can easily acquire "pole rights" that are needed for their shoe box sized product.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Cellular Digital Packet Data (CDPD) capability. CDPD is the wireless transmission "over the air" of digitized data with a direct connection into the state wide area network (not a modem communication device). Usage is <u>not charged</u> at per minute cellular telephone rates but is billed at a flat monthly rate (currently anticipated to be $30 to $40 per month). Wireless digitized data transmission speeds up to 19.2 kbps will be possible with CDPD technology.

A large potential application for CDPD technology is telecommuting.

Expected Benefits

One of the "wireless telecommunications technology categories", CDPD capability will allow cellular transmission of digitized data. Digitized transmission of data "through the air" will allow remote business uses of computers on WANs for applications such as: remote monitoring of vending machines; E-mail, FAXing, meeting calendaring, and accessing information (databases) on all devices connected to the wide area network (mainframe computer, mini computers, LANs, etc.)

Who is Responsible

Cellular One (McCaw Cellular Communications) / Division of Information Technology Service (ITS)

Status as of December 1995

Currently Available for Use: Full service is now available only in a limited area of downtown Salt Lake City.

In-Progress: Service is currently being expanded to include only the Wasatch front area.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Expected Benefits

Who is Responsible

Status as of December 1995

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Expected Benefits

Who is Responsible

Status as of December 1995

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Provide portable, electronic messaging service to subscribers of electronic paging services. Service can be at two levels:
1. A beep signal which indicates only to call a telephone number.
2. An electronic message that tells the paging service customer what the message is, in addition to being alerted by the traditional "beep".

Expected Benefits

Electronic paging/messaging provides communications services and notifications to people anywhere within coverage areas of the state (or optionally, national coverage)

Who is Responsible

US West Messaging / McCaw Communications / and others.

Status as of December 1995

Currently Available for Use: Electronic paging and electronic pager messaging service is now available in areas of Utah as indicated by the map. Also, service options allow customers to expand coverage throughout most of the country.

Microwaves are electromagnetic signal broadcasts above the one Gigahertz (GHz) range. A Gigahertz is a electrical signal broadcast at one billion cycles per second. Microwaves can be broadcast between reception / transmission devices located on earth or in space orbiting around the earth. Looking around Utah, microwave transmission / reception devices can be seen on hilltops, building rooftops, and other areas where unobstructed microwave signals can be transmitted or received.

(also known as "Geosynchronous" satellites) Microwave Transmissions

Satellites sent into orbit 35,900 kilometers (22,300 miles) or higher above the earth's equator achieve a speed the same as that of the earth rotating, so the satellite appears to be stationary at all times in relation to a position on the earth. These types of satellites are known as "geostationary satellites" and their ability to maintain a constant position in relation to the earth allows digital data to be beamed up to the satellite from an earth station, known as the "uplink". The signal is received on a transponder located on the orbiting satellite. The signal is amplified (strengthened) by the satellite mounted transponder and the signal is then sent back down to earth, where the signal is received on a device known as the "downlink". The uplink and downlink data streams are sent at different frequencies to separate the signals. Gyroscopes are used on the satellite to keep the satellite's antennae from spinning, allowing the antennae to constantly face the earth, in addition to the satellite's ability to maintain a geostationary position above the earth. This creates a platform to send and receive signals anywhere on earth that a corresponding satellite downlink is located. These downlinks can be large satellite receivers, such as those used by the cable TV companies, smaller receivers such as home satellite dishes or business data satellite dishes, or other types of satellite reception devices.

When the digital signal is sent from earth to the satellite and back to earth, this takes about half a second. While this may seem fast, it can be annoying depending on what services are being provided to the user. If the user is receiving television data, a constant half second delay in the digital data stream is not noticed. If the user is an interactive data stream, the 1/2 second delay occurs at each end of the transaction, creating a noticeable delay for the users.

Low earth orbiting satellites (Leos) orbit the earth constantly. Because a LEOS is constantly moving, the period of time that a communications link could be established between the LEOS and the earth station is limited. To offset this effect, a lot of LEOS are sent into orbit so that at any point in time, one of the LEOS is available for communications with the earth station and then the signal is switched to the next satellite in appropriate position.

Digital point to point microwaves operate like satellites, except the data transmission does not go into space. Instead, digital microwave transmission / reception devices are located on mountaintops, hilltops, atop large buildings, etc. The digital signal needs a clear line of sight path between the sending point and the receiving point. Since the digital signal does not travel as far a distance as satellite digital signals do, the transmission time is less.

Digital microwave transmission is used where the volume of traffic or terrain does not justify a direct fiber optic line interconnection.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

"Satellite telephones" are devices used to broadcast voice and digitized data from most areas of the planet. The user sets up a little satellite transmission and reception antennae wherever they desire to broadcast from, usually with a self contained power supply, and sends the transmission.

Expected Benefits

This technology is mostly used in special circumstances where all of a sudden, communications capability is needed from remote regions for a temporary period. An example, National Transportation Safety Board investigators all of a sudden need to establish high quality, reliable communications capability at an airplane crash site for a temporary period of their investigation. Satellite telephones provide the means.

Who is Responsible / Status as of December 1995

This service is currently available in Utah. Contact a local satellite telecommunications provider listed under "satellites" in the Yellow Pages of the Telephone Directory.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Global Positioning System (GPS) is a wireless technology used to determine exact locations on the planet earth (including Utah). Twenty four satellites currently orbit the earth transmitting signals. By using a GPS receiving device (or a GPS PCMCIA card in a laptop PC) and receiving an unobstructed signal from at least 3 of the orbiting GPS satellites, a user or another party can determine the exact location of a tramsitting device on the planet (within 30 feet). This technology can also

be used in combination with other technologies, such as mapping software allowing mobile users to locate addresses and positions on detailed street maps.

Expected Benefits

Emergency or public service vehicles could use this technology to rapidly and accurately locate their current position while travelling and have exact road map travel instructions displayed on a software map readout to assure minimum response time to reach hard to find emergency fire, police, or medical situation address calls. Military people could use this technology to put a cruise missile through your living room window. Commercial delivery business and many other people could also use the technology to track the location of their vehicles at any time. Drivers of rental cars could determine exactly where they are in strange cities, and receive computerized driving direction instructions to reach their destination in the most direct route from wherever they are located. There are many other potential uses.

Who is Responsible / Status as of December 1995

This service is currently available in Utah. Contact a local satellite telecommunications provider listed under "satellites" in the Yellow Pages of the Telephone Directory.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Personal Communications Systems (PCS) / Personal Communications Network (PCN) service is the telephone of the future which will go anywhere you go. Initially, PCS / PCN service will allow voice, paging, E-mail, FAXing, and other services over the same "wireless telecommunications network".

Expected Benefits

PCS/PCN technology will allow people to strap a communications device (like a telephone) onto their belt or put it in their purse, and remain in touch wherever they go.

Who is Responsible / Status as of December 1995

On October 26-27, 1994, the Federal Communications Commission (FCC) conducted license auctions for national and regional narrowband PCS/PCN providers. The successful bidders were:

Market Number	Name	Winning Bidder	Bid Amount
N1 [5050KHz paired]	9065	Paging Network of Virginia	$ 80,000,000
N2 [5050KHz paired]	9065	Paging Network of Virginia	$ 80,000,000
N3 [5050KHz paired]	5398	KDM Messaging Company	$ 80,000,000
N4 [5050KHz paired]	5398	KDM Messaging Company	$ 80,000,000
N5 [5050KHz paired]	7884	Nationwide Wireless Network	$ 80,000,000
N6 [5012.5KHz paired]	7561	Airtouch Paging	$ 47,001,001
N7 [5012.5KHz paired]	1006	BellSouth Wireless	$ 47,505,673
N8 [5012.5KHz paired]	7884	Nationwide Wireless Network	$ 47,500,000
N10 [50KHz unpaired]	9065	Paging Network of Virginia	$ 37,000,000
N11 [50KHz unpaired]	9683	Pagemart II, Inc.	$ 38,000,000
		Total for Narrowband PCS/PCN licenses	$ 617,006,674

In December 1994, the FCC auctioned broadband PCS / PCN licenses. Several "positioning mergers" have recently occurred before the recent $7.7 billion FCC license investment needed to implement PCS / PCN technology, such as the McCaw / AT & T partnership, the National Wireless Alliance (US West, Bell Atlantic, Nynex, and Air Touch Communications), and the Sprint / cable TV company partnership. The FCC's auction, which ran from December 5, 1994 until March 13, 1995 raised over $7 billion for the U.S. Treasury, making it the biggest auction in history. The FCC's broadband PCS auction offered 99 licenses to provide wireless personal communications services across the United States and its territories. The services, which will use stateoftheart devices like lightweight, portable phones, can provide competition to the cellular telephone industry. There are currently two cellular providers per market. After the FCC's series of auctions, there could be as many as eight wireless providers in each market, all competing with each other and driving down prices. The broadband PCS auction was the largest auction that the FCC has held to date.

Since 1993, when the FCC was authorized by Congress to conduct spectrum auctions, the Federal Communications Commission has held four auctions, two for narrowband PCS licenses (which offer mobile services like twoway paging), one for Interactive Video and Data Service licenses (which allow consumers to interact with their computers or TVs), and the justcompleted broadband PCS auction. The four auctions have raised a total of $8,995,080,217 for the U.S. Treasury, or about $98 per U.S. household.

For the Utah PCS/PCN service market, the winner of the Broadband PCS service license is AT & T Wireless PCS, Inc. who paid $1.7 Billion for the right to provide this service.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Public safety radio communications in Utah are currently conducted using the 150 MHz frequency, which is at maximum capacity. The State of Utah requires additional capacity to implement mobile data transmission capability to public safety service units. The US Federal Communications Commission recognizes this problem that exists throughout the country and in mid 1980s designated a new frequency for public safety use, the 800 MHz frequency. The 800 MHz frequency will be able to accommodate both voice and data transmission needs, plus allow expansion of use.

Expected Benefits

The use of 800 MHz frequency based hardware / software should allow efficient mobile voice / data transmission to mobile public units (police vehicles, fire vehicles, emergency medical care vehicles, and others). This will also allow all public safety type units to communicate using a common frequency which will also allow shared system development and funding.

The ability to access more computerized information from mobile units will allow suspects to be finger printed and computer fingerprints analyzed in patrol vehicles; wireless transmission of pictures; and other increases in functionality. For example, a recent case occurred in the State of California. A second similar kidnapping followed the Polly Klass kidnapping and murder. The area where the second incident occurred had 800 MHz technology, and its use allowed law enforcement personnel to apprehend the suspect and free the victim before it ended in a manner similar to the Polly Klass kidnapping.

Who is Responsible

Utah's 800 MHz Task Force which consists or public safety representatives from city, county, state, and federal agencies.

Status as of December 1995

The 800 MHz Task Force has defined a migration path and 32 specific objectives to accomplish the transition to 800 MHz technology. The State of Utah Department of Public Safety, Salt Lake County, and Layton City are in the process of beginning to acquire initial 800 MHz equipment for a pilot program.

To many people, this is their interpretation of the electronic highway - 500 channels on their TV and video-on-demand. These services are the focus of the most significant changes about to occur on the consumer portion of the electronic highway. Consumer television services are the primary economic issue driving private sector investment in the electronic highway. Video-on-demand will cause the most demand for bandwidth / high capacity networks. Several hundred TV channels will also demand high bandwidth. When High Definition Television (HDTV) technology arrives in the marketplace and is implemented by consumers, HDTV will also significantly increase bandwidth needed, probably requiring about 500 Megabits per second signal transmission speed for each HDTV channel on the electronic highway.

Recent implementations of technology, recent court cases, and proposed federal legislation expected to pass is "opening the door" for a business market for providers of entertainment television services. Regional Bell Operating Companies, such as US West, are positioning themselves to enter this market. Cable TV companies are also positioning themselves to implement more television channels and video-on-demand. TCI cable is using a combination of implementing signal compression technology, upgrading their cable infrastructure, and also providing satellite services (PrimeStar). Other companies such as Thomson-RCA are marketing high bandwidth television services which should also provide video-on-demand. Even computer software companies are preparing to provide video-on-demand service, such as Microsoft with its Iceberg/ Penguin / Tiger line of video-on-demand Microsoft products.

In the late 1970's , early 1980's, cable TV companies installed high bandwidth coaxial cable into the homes of Utah's citizens. However, cable TV is broadcast from a head site satellite reception location which sends signals one-way through the cable system in consumers homes. So, while the cable providers have bigger wires (coaxial) already installed into homes, they don't have switched, two-way networks like the telephone companies. So, cable companies are either forming business relationships with telephone service providers that have switched networks, or they must develop switched networks.

Telephone companies have two-way switched networks, since that is the type of telecommunications service that they have been providing to consumers, but the phone companies have an installed base of small, twisted pair copper wires into the homes of Utah's citizens. Telephone companies are implementing high bandwidth fiber connections to the curb near consumer's homes, and will install a combination of coaxial cable, copper twisted pair wiring to provide video-on-demand services. The telephone companies still need the copper wire technology into the homes for the phones to work, especially during power outages. Costs per household are estimated to be in the $1,000 per household range, such as US West's Multimedia Service initiative that was announced in March 1994.

A third sleeping giant has also quietly positioned to provide video-on-demand services. They already can provide high bandwidth and 150 TV channels using one-way digital telecommunications service into consumers homes for about $700 -$900 per household. Without bringing significant attention, they are also providing data ports with their hardware products to implement video-on-demand capability. This technology is Digital Broadcast Satellite (DBS) Service (DSS) marketed initially by Thompson-RCA, but with two other very large manufacturers also entering the DSS hardware market in 1995. These units are selling very fast, and some dealers cannot keep them in stock. In Chicago, dealers sold 100,000 units the first day they were announced.

Other players are also in the competition, such as C-Band and KU-Band satellite service providers. Even if you don't want 150 channels and prefer to watch the traditional, local consumer television channels using your rabbit ear antennae, significant changes are also occurring in Utah with network affiliation switches by CBS and NBC. So, prepare for significant changes whatever method of television service planned to be used.

Executive Summary of Service / Initiative

One-way broadcast of commercial TV service. These are high quality TV services available at no cost once the TV is acquired.

Expected Benefits

Offers high quality news, entertainment, and other services for the minimum cost.

Who is Responsible

KUTV / KTVX / KSL / KJZZ / KSTU / KOOG

Status as of December 1995

Currently Available for Use: These services have been around for many, many years and will continue to be available for use by Utah's citizens. A major change which occurred in September 1995 is a local station affiliate switch. The prior Utah channel 2 (KUTV) which had been affiliated with NBC, became affiliated with CBS and began to broadcast the national CBS programs. The local NBC affiliate became KSL, channel 5. Also, KOOG recently affiliated with the new Warner Bros (WB) Television Network and began to phase in broadcast of WB network affiliate programs. Also, KJZZ Channel 14 began affiliation with the new United Paramount Network (UPN).

The Status of Utah's Electronic Highway Infrastructure

KUED's coverage

Executive Summary of Service / Initiative

One-way broadcast of public TV (educational) service. These are high quality TV services available at no cost once the TV is acquired.

Expected Benefits

Offers high quality entertainment, educational courses, and other services for the minimum cost.

Who is Responsible

KUED / KBYU / KULC

Status as of December 1995

Currently Available for Use: These three educational TV channels have been available for years in the Utah viewing areas.

KULC's coverage

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Two-way interactive educational TV service. EDNET, using a combination of microwave, fiber, compressed and non-compressed video and audio, broadcasts K-12 and college courses. These are multi-channel, two-way, interactive video classes broadcast to hub sites. The hub sites then provide multi-channel, two-way service to some high schools within their geographic area. These are closed TV broadcasts.

Expected Benefits

This medium provides the "electronic high school" and "electronic college" for Utah's citizens.

Who is Responsible

Utah Education Network (EDNET) / COMNET /UVSCNet and others.

Status as of December 1995

Currently Available for Use: This is a closed-reception analog educational TV system that has been available for many years.

In-progress: An initiative is underway to combine EDNET TV broadcasts into a digital technology and merge it onto one state telecommunications network

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Two-way commercial video TV service.

Expected Benefits

This medium allows participants to view closed circuit seminar speeches, or participate in remote business meetings, etc.

Who is Responsible

US West Commercial Video Services / AT & T Global Business Video Services / Keystone Communications / others.

Status as of December 1995

Currently Available for Use: This technology has been available for several years.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

High quality TV broadcasts are received on satellite dishes at the cable TV's satellite farm. The signal is transmitted over the cable network to residences, entering homes via coaxial cable. Currently, a maximum cable TV service of 36-40 video channels is offered to Utah citizens. A planned increase in the number of cable TV channels is scheduled n two phases: The first phase is to implement signal compression technology, and should be completed in 1996 and increase cable TV channels from the current 36-40 channels to approximately 80 channels. The second phase, planned to be completed in 1998, should provide several hundred channels.

Expected Benefits

Increasing the number of cable TV channels will increase the variety of entertainment options for Utah's citizens.

Current cable TV systems are at peak capacity and cannot add more cable TV channels without implementing increased bandwidth or using signal compression technology.

Who is Responsible

TCI Cable Inc. / Insight Cable TV / DirectVision / other Cable TV service providers

Status as of December 1995

Currently available for Use: Viewers can now watch a maximum of 36-40 TV channels.

In-progress- Phase I: TCI Cable plans to implement signal compression technology to be available in 1996 which should increase the number of TV channels to approximately 80.

In Phase II, which is currently planned to be completed in 1998, TCI plans to implement new high bandwith cable TV service to Utah customers that will provide several hundred channels.

For a complete listing of television networks currently available in Utah using this medium, see Appendix A.

Utah has 628,526 households, with an average household size of 3.11 people per household. Currently, cable TV service is provided to at least 248,718 households state-wide, which is about 40 %, and is distributed around the state as indicated below:

Name of Service ProviderNumber of CustomersGeographic MarketContact / Telephone NumberTCI Cable198,000Generally Throughout UtahVicky Johansen, TCI's Utah Marketing Director, (801-488-5603)Insight Cablevision31,500Sandy (part), West Jordon (part), Midvale, Orem, Lindon, Alpine, Highland, Pleasant Grove, Mapleton, Springville, American Fork801-566-0694Falcon Cablevision7,600Washington County Area (St. George and surrounding cities)Rich Reneiwicky (801-673 -6605)Clearvision5,000Approximately half of the St. George, Utah area.Brad Oliverson (801-674-2212)Premiere Cable Services (and Premiere Cable II)2,748 (plus 1,000 bulk to Bryan Head which is not included in Utah total.)Parowan, Enoch, Beaver, Mona, Santaquin, Panguitch, Eureka, Monroe, and Bryan Head areas(Marilyn Moore) 1-800-451-3029Northstar Communications335Cedar Hills area(Ben Cluff) 801-785-3396Provo Cable Co.2,800Provo area801-377-1360Dugway Cable TV485Dugway area801-831-4404ETV250Emery, Carbon, Grand, Sevier, Wayne, and Iron counties(Mike McCandliss) 801-748-2388
Skyview Technologies, Southern Utah Cablevision, Channel Communications, Roosevelt Cable TV, Sonic Cable TV, Colonial Cablevision, and TGM Communications, Inc. did not respond to our information requests.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Within this category, there are three principle DBS technologies / broadcast service provider groups:
Category 1: A joint business venture between Thomson RCA Electronics (the "RCA DSS system"), with program viewing services provided by DirecTV (GM Hughes Electronics) and United States Satellite Broadcasting (USSB). This group has three DBS satellites currently in orbit. In 1995, Sony Corporation also began marketing under their brand name the licensed RCA DSS technology, which was allowable as soon as Thomson RCA sold 1 million units.
Category 2: EchoStar, who launched their first DBS satellite in 1995.
Category 3: PrimeStar, who presently has one quasi-DBS satellite in orbit. PrimeStar is marketed by the Cable TV companies, such as TCI cable.

Digital Broadcast Satellite (DBS) technology is a high power, 120-200 watt, high quality, digital satellite signal broadcast / reception technology. Digital Broadcast Satellites have eight orbital positions assigned for the United States. Each of these eight locations can have 32 transponders for a total of 256 possible broadcast signal channels. Digital and audio signal compression technology will further increase the number of actual viewable consumer TV channels because signal compression technology should allow as many as 10 TV consumer channels per DBS broadcast signal channel, ultimately possibly allowing thousands of consumer TV channels.

Of the eight allocated digital broadcast satellite (DBS) orbital positions, three positions can deliver DBS signals across the whole continental United States - two belong to Hughes Electronics DirecTV and one belongs to EchoStar. United States Satellite Broadcasting (USSB) has subleased five transponders on one of the Hughes Electronics DirecTV satellites and DirecTV has the remaining transponder channels on these two DirecTV owned satellites. Currently the USSB/ DirecTV business venture offers consumers about 150 digital TV channels and 28 digital music channels. The third satellite position is owned by EchoStar, who will launch their DBS satellite in early 1995. Of the other 5 (of 8 total) available DBS satellite positions, one position can cover the Eastern part of the country, and four positions can provide DBS broadcast signals to the western part of the US. DirecTV also launched a third DBS satellite in mid 1995.

A true DBS satellite system uses Motion Picture Expert Group I (MPEG-1) or MPEG-II digital signal compression technology and broadcasts at high power: 120 to 200 watts. So, true DBS systems require a very small 18" satellite reception dish to collect the microwave signals. Currently, both RCA DSS and EchoStar systems use MPEG-I technology. In 1995, both RCA's DSS systems and EchoStar's system will convert to MPEG-II signal compression technology. When this occurs, there should not be any changes needed in consumer reception equipment.

A quasi-DBS satellite system, such as PrimeStar, does not use the MPEG-I (or MPEG-II) digital signal compression technology and is broadcast at medium power: 48 watts.
So, PrimeStar technology requires a bigger 39 " satellite reception dish to collect the microwave signals. PrimeStar does not currently use MPEG-I (or MPEG-II) signal compression technology, but plans to convert to MPEG-I and high power (120 -200 watt) broadcast technology in 1995.

/ :

Because DBS technology is a high power broadcast, clear reception is received on a very small 18" satellite dish which gathers the microwaves and sends them on to be decoded on a DBS receiver unit. The 18" DBS satellite dish can be much smaller than the 7 1/2 to 12 foot dishes of C/KU band satellite systems because of the higher power signal used. (120-200 watts versus 8-20 watts of the low power C/KU band systems). The 18" dish receives a signal from fixed position

The DBS consumer purchases the satellite equipment (an 18 inch dish, main receiver unit, and remote control unit) which costs $699 (or $899 for the deluxe version), plus $150-$200 for installation. The basic $699 package will connect one TV within a residence and has only one signal receiving connection on the satellite dish's LNB signal converter. The deluxe version ($899) has two signal receiving connections on the dish LNB which would allow connection to a second receiver for enabling a second TV.
The $899 receiver also provides consumers with a "high bandwidth digital data port", for future services not yet unannounced. Both versions include a "low bandwidth digital data port", also for future, currently unannounced services. The 18" dish is installed to face with an unobstructed access toward 152 degrees (magnetic). Once securely mounted, the dish is connected via coaxial cable to the receiver unit inside the residence. The receiver unit includes a signal decoder, microprocessor, 1200 baud modem, an electronic access authorization card, and a digital to analog signal converter. The receiver is connected to the TV, coaxial cable input from the dish, a power supply, the telephone line, and any other devices desired, such as a stereo amplifier, VCR, etc. The system is now up and running. Periodically, a telephone call from USSB/DirecTV to the receiver unit's modem / microprocessor updates the access card for continuing service (if the service is paid for). The electronic access card also stores video on demand services purchased for the month. To order a specific video on demand service offered on one of the 100 PPV channels, the consumer simply presses the remote control unit when the "order option" appears on the screen. The system also includes several electronic parent controlled lockout features, such as allowing parents to restrict access to selected movies based on ratings (such as R, PG, etc.) or by $ cost per item. Electronic mail (E-Mail) can also be sent to your DSS receiver / TV from the service providers, such as notifications of new services, etc.

Monthly DSS service costs range from $21.95 to $64.95, depending on the number of premium channels desired by the consumer. Pay per view (PPV) includes movies at $2.99 each, plus other special PPV features, such as Championship PPV Boxing, Rolling Stones concerts, and whatever else is happening in the future.

This system will also offer additional unannounced services that will utilize the narrowband and wide-band data ports provided with the receiver hardware.

:

PrimeStar uses a completely different marketing approach. The consumer does not purchase the PrimeStar satellite equipment, instead it is rented from the provider and the consumer only has to pay the $150 to $200 installation costs, plus monthly service charges for TV broadcast program services.

Expected Benefits/ Potential Disadvantages

1. The video and audio quality is excellent. When the consumer switches from DSS to cable, the difference is noticeable.

2. This service offers lots of channels now. (See Appendix A, DSS column for details and comparison)

3. A disadvantage is that the local TV network channels are not picked up with DSS broadcast reception.

4. Two people within a household cannot watch different channels on different TVs, unless a second $649 DSS satellite receiver is purchased for the second TV and is also connected to the deluxe satellite dish with two inputs. For each additional receiver in a residence, the USSB /DirecTV service cost increases approximately $1 per month.

Who is Responsible

Thomson Consumer Electronics - Radio Corporation of America (RCA) / GM Hughes Electronics / United States Satellite Service (USSB) / DirecTV / EchoStar (a different provider of DBS services) / PrimeStar (TCI Cable).
Status as of December 1995

Currently Available for Use:

1. Satellite and receiver equipment is currently available in RCA's and Sony's designated Utah retail outlets. DirecTV has launched three satellites into orbit with current digitized television broadcast capability of about 150 stations available for TV reception today.

2. PrimeStar systems are currently available for use and PrimeStar provides about 45 TV channels.

For a complete listing of television networks currently available in Utah using this medium, see Appendix A.

In Process:

1. EchoStar will launch a DBS satellite in early 1995. EchoStar is also converting to MPEG-II technology.

2. PrimeStar is converting to MPEG-I technology and high power (120-200 watt) broadcast technology in 1995.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

C-Band satellite is a low power, 8 to 20 watt, high quality, analog signal broadcast / reception of 256 television channels and about 30 analog music channels. Because it is a low power broadcast that focuses on 22 different satellites orbiting the earth in space, consumer reception is received on a very large dish - 7 1/2 feet to 10 feet in diameter that is movable to point toward the broadcasting satellite. C-Band is a high quality analog system which requires satellite dish equipment and a receiver unit with signal descrambling capability (needed for some broadcasts). C-Band satellites broadcast to consumer owned "downlinks" in the 3.7 GHz to 4.2 GHz microwave range.

Initial costs to consumers range from $2,500 to $4,200. Monthly costs (for VideoCipher II descrambling capability) approximate $9.95 per month, plus additional fees for descrambling of premium channels. Most broadcast entertainment channels are now scrambled, using VideoCipher II signal scrambling services, from whom users can subscribe for descrambling services and VideoCipher II equipment. (or through their C-band satellite system product retailer). Also, a new "TvPass electronic card" will be used for descrambling VideoCipher II signals in the future.

Some satellite receivers are capable of handling both C-Band and KU-Band broadcast signals (see next page for KU-Band info).

Expected Benefits

1. This service offers the most channels as of October 1994 (256 channels).
2. C-band technology has been around for about 15+ years.
3. Some residential subdivision covenants may prohibit these big dishes.
4. Many channels are now scrambled to preclude free broadcast reception.
5. The local TV network channels are not picked up on C-band broadcast reception.
6. The "channel count" includes 19 pay-per-view channels.

Who is Responsible

Many C-band satellite retail providers are in business in Utah.

Status as of December 1995

Currently Available for Use: This technology has been available in Utah for at least 15 years. Current satellite TV service is about 256 channels available for reception.

For a complete listing of television networks currently available in Utah using this medium, see Appendix A.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

This is a high quality, low to medium power system that uses 4 foot to 12 foot satellite broadcast reception dishes to receive broadcast signals from about 125 satellites. (Channel One available in some schools comes in on this technology).

KU band satellites broadcast in the 11 GHz to 13 GHz microwave frequency band which broadcasts 32 channels per satellite.

Expected Benefits

1. This service offers lots of channels in 1994.
2. The local TV network channels are not picked up on KU-band broadcast reception. However, service offerings do include an option for the national networks from large eastern metropolitan cities (except Fox which comes from a San Francisco affiliate).

Who is Responsible

1. KU-band satellite system retailers in Utah.

Status as of December 1995:

Currently Available for Use: As of April 1995, 125 KU-band channels are available for reception in Utah.

For a complete listing of television networks currently available in Utah using this medium, see Appendix A.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Provide audio services with a wide variety of entertainment music, similar to playing CDs but without having to purchase or play the CDs. Also, provide special interest radio services.

Expected Benefits

1. Satellite radio offers "special interest" radio broadcasts.
2. Digital audio services offer non-stop, commercial free music in a variety of categories, such as classical, jazz, rock, oldies, heavy metal, country, gospel, and numerous other music categories. Some services also offer accompanying digital readout information which identifies the music, composer, and provides other educational information about the music. This can help listeners learn about classical music, jazz, etc., depending on the individual's music area of interest.

Who is Responsible

Satellite system retailers in Utah / Cable TV companies

Status as of December 1995

Currently Available for Use: These services are currently available in Utah.

Cable TV Audio Service:	Digital Music Express (DMX) audio services are available through your Cable TV company which offers 30 different audio channels.
C-Band / KU-Band Satellite Audio Service:	Satellite Radio Services are available on 106 different channels
Direct Broadcast Satellite (Digital) Service:	This system currently offers MC Music which has 28 different digital music channels.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Teletext is an electronic news and information service that is transmitted along with regular TV programming. Teletext information is inserted into an unused portion of the outgoing video signal called the Vertical Blanking Interval (VBI). The information is coded in digital form and requires a special teletext receiver /decoder unit to decode and display the data on your personal computer or television.

Teletext data includes up to the minute news, sports, weather, stock quotes from the New York, American, and NASDAQ stock exchanges, mutual fund prices, commodity prices, gossip, soap opera news, and other topics. The data can be saved and summarized on personal computers, displayed in graphic forms, and otherwise used the same as other computer data.

Expected Benefits

Teletext provides data such as up-to-the-minute stock market quotes, news services, etc.

Who is Responsible

TCI Teletext / TempoText / ITC

Status as of December 1995

Currently Available for Use: As of April 1995, this service is available for use in Utah.

The Status of Utah's Electronic Highway Infrastructure

Executive Summary of Service / Initiative

Utah has many AM and FM commercial broadcast radio stations that have existed for years. A new technology, the Radio Broadcast Data System (RBDS) subcarrier transmissions will allow looking at the text of radio broadcasts on personal computer(s). The technology requires a half-length ISA board to your personal computer to interpret the subcarrier signal data, plus speakers. The PC board costs less than $250, and many personal computers sold in the market today come with speakers for multi-media functionality.

Expected Benefits

This technology will allow closed-captioning of radio broadcast information. In the future, it may also allow a methodology to capture and save text for later reading at a more convenient time.

Who is Responsible

Utah's commercial radio stations.

Advanced Digital Systems (1-800-888-5244) produces the RBDS enabling PC boards.

Status as of December 1995

Currently Available for Use: Currently, about 400 radio stations in the U.S. carry RBDS subcarrier signals with their normal radio broadcasts.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Establish electronic mail (E-mail) access for Utah's citizens to Utah's elected officials: (the Governor, Lt. Governor, Utah State Legislators (State Senators and State Legislators); the Utah State Attorney General; the Utah State Auditor.; and the Utah State Treasurer. Establish E-mail access using several alternate E-mail access methods, such as Internet E-mail, WordPerfect Office E-mail, several of the commercial E-mail access providers such as Compuserve, America On-line, etc.; and possibly also using a new state bulletin board system (BBS).

Expected Benefits

1. E-mail is received and stored until opened, allowing Utah's citizens a means to communicate with the elected official(s) office 24 hours per day, seven days a week.
2. Using WordPerfect E-mail is the easiest and quickest method via Utah's wide area network.
3. The bulletin board provides an alternative means of electronic E-Mail access to the Governor for Utah's citizens who do not presently have access to INTERNET or the state wide area network. Access using E-mail assures those Utah citizens that desire to express their views on issues to the elected officials that their inquiry will be received and opened even though they may be otherwise occupied on state business at the time the citizen wants to send it. E-mail is stored until retrieved and opened.

Who is Responsible

To establish electronic mail to:

Governor and Lieutenant Governor:	Governor's Office of Planning & Budget / Division of Information Technology Services
State Senators and State Representatives:	Office of Legislative Research & General Counsel / Division of Information Technology Services
State Attorney General:	Office of the Attorney General / Division of Information Technology Services
State Auditor	Office of the State Auditor / Division of Information Technology Services
State Treasurer	Office of the State Treasurer / Division of Information Technology Services

Status as of December 1995

Currently Available for Use. To send electronic mail (E-mail) to:

Governor Leavitt:

Using Internet E-mail	By sending Internet E-mail to "governor@email.state.ut.us", Governor Leavitt will receive the Internet E-mail.
Using the state BBS:	By dialing 801-538-3383 (or only if outside the SLC local calling are, dial 1-800-UTAHNET) using a PC and modem, Utah's citizens can electronically communicate with Governor Leavitt. (Modem settings should be 8 bits, no parity, 1 stop bit.)
Using WordPerfect Office E-mail:	Address E-mail using the WAN to Governor Leavitt's address listed in the state WordPerfect Office E-Mail address book. Bulletin Board (BBS) electronic mail access was implemented in August 1994.
Using commercial E-mail:	When using services such as Compuserve, America on-line, Prodigy, etc. address the electronic mail to the Internet address.

Lt. Governor Olene Walker:

Using Internet E-mail:	By sending Internet E-mail to "owalker@email.state.ut.us", Lt. Governor Walker will receive it.
Using the state BBS:	Use the same method as listed for Governor Leavitt listed above.
Using WordPerfect Office E-mail:	Use the same method as listed for Governor Leavitt listed above.

State Senators / State Representatives:

Using Internet E-mail:	E-mail access to these elected officials is currently in process and should be in operation in early 1995.

Attorney General Jan Graham:

Using Internet E-mail:	By sending Internet E-mail to "jgraham@email.state.ut.us", it should be received.
Using the state BBS:	Use the method described for the Governor above, except select the Attorney General as the option.

State Auditor Tom Allen, CPA:

Using Internet E-mail:	By sending Internet E-mail to "tallen@email.state.ut.us", it should be received.

State Treasurer Edward T. Alter, CPA:

Using Internet E-mail:	By sending Internet E-mail to "ealter@email.state.ut.us", it should be received.

Millions of other people in the world:	Send the Internet E-mail to their appropriate address.

Communicating Electronically with Utah's Federal Government Elected Officials:

US Senator Orrin Hatch:

Using Internet E-mail:	Service is currently not available.

US Senator Robert Bennett:

Using Internet E-mail:	Service is currently not available.

US Representative Jim Hansen:

Using Internet E-mail:	Service is currently not available.

US Representative Enid Green Waldholtz:

Using Internet E-mail:	By sending Internet E-mail to "enidutah@hr.house.gov", it should be received.

US Representative Bill Orton:

Using Internet E-mail:	By sending Internet E-mail to "ortonut3@hr.house.gov", it should be received.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement an electronic bulletin board system (BBS) for Utah's citizens and others to electronically access a repository of state data, such as economic data, speeches, reports, meeting minutes, state budget data, and the general categories of information

that the State of Utah normally makes available in printed form to the public.

Expected Benefits

By Utah's citizens obtaining the data electronically, it is free and saves the state the cost of printing the material. The information can be immediately electronically accessed and obtained at their location at no cost by anyone at any location in the state or country with a modem, telephone connection, and computer equipment.

Who is Responsible

The Division of Information Technology Services established and runs the bulletin board. Individual managers in all state agencies are responsible to upload their key public information to the bulletin board and maintain the latest version on the BBS.

Status as of December 1995

Currently Available for Use This service is currently available for use and is called "UTAHNET". By dialing 801-538-3383 (or only if outside the SLC local calling are, dial 1-800-UTAHNET) using a PC and modem, Utah's citizens and others around the country can electronically communicate with the state BBS and obtain much state information. (Modem settings should be 8 bits, no parity, 1 stop bit.). The following conferences are available on the state bulletin board system (BBS):

A "main board conference" for BBS messages, and other general information.

1. Air Quality Data.
2. Governor's Office of Planning & Budget Data (GOPB) including economic and demographic information about Utah; state-wide planning information; UACIR information (local government plans);Governor's office speeches and press releases; information technology information, including this document (Technology 2000); the state budget; and other data.
3. Utah Department of Transportation (UDOT) information such as upcoming public hearings, construction reports, current road conditions, etc.
4. Department of Public Safety information, such as law enforcement safety information, crime statistics, etc.
5. State Purchasing Information, such as current state contracts, bid documents and other data.
6. Department of Human Resources (Personnel) information, such as current position openings, training schedules, position specifications, and other data.
7. Attorney General information, such as consumer information, press releases, and other data.
8. Job Service information, including labor market statistics, affirmative action reports, etc.
9. A copy of the Utah Administrative Code, proposed rules, and rule changes.

There are also several additional conferences still under construction. Other information is available such as FREENET computer software, Internet technical support information, an issues debate forum, summaries of headlines of each daily USA Today newspaper, disabilities information and software for people with disabilities; an d much other data.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

1. Provide Utah state legislators and Utah state government agencies with electronic bulletin board (BBS) access to Legislative Bills within one day of their introduction into the Utah State Legislature. This service is provided by the LIPS system, Legislative Information Processing System.
2. Provide Utah's citizens and business community electronic access to Legislative Bills within one day of their introduction into the Utah State Legislature using the LIPS system, the Legislative Information Processing System.
3. Provide Utah's citizens with INTERNET gopher service electronic access to Utah State Legislative Bills introduced or passed during the 1993, 1994, 1995, and future legislative sessions.
4. Provide the Governor's office with Folio-based searchable (within texts of bills) access to Legislative Bills within one day of their introduction into the Utah State Legislature. This is the Legislative Tracking System with remote electronic access available using the state wide area network.

Expected Benefits

In it's brief 45 day annual flurry of activity, the Utah State Legislature drafts and introduces about 800 - 1,000 Senate and House Bills, each Bill averaging from 2 to 200 pages in length. Utah's citizens have the right to review proposed legislation and contact their elected state official(s) about the legislation.

1. From their homes and offices, Utah's citizens will be able to obtain no-cost copies of proposed legislative bills within one day of the legislation's introduction into Utah's legislative process. The LIPS system will allow anyone with a modem and computer to use this service. In the past, Utah's citizens would have to come to the state capitol to the Legislative Bill Room and pay $.10 per page to obtain the information. With these new services, Utah's citizens will now be able to do this from their homes or offices at no cost. Not only will this be more convenient, it could also potentially save Utah's citizens
2. For those that have Internet service in their homes or businesses, Utah's citizens will be able to obtain copies using easy to use Internet gopher services. If the person does not have Internet access from their home or business, they will also be able to stop by their public library to use Internet services and accomplish the same.
3. Bulletin board service (BBS) provides an alternative, no-cost methodology to obtain the information to a wider group of Utah's citizens since more people probably have simple modems and computers than might presently have Internet access. Although this is a less desirable technology than using the Internet, more people may be able to use it. at the present time
4. The Folio-based system allows searching all bills for key words within the body of the texts of the bills.

Who is Responsible

1. Office of Legislative Research & General Counsel / X-Link Inc.
2. Office of Legislative Research & General Counsel / X-Link Inc.
3. Office of Legislative Research & General Counsel / University of Utah
4. Office of Legislative Research & General Counsel / Governor's Office of Planning & Budget

Status as of December 1995

Currently Available for Use:

Service Initiative No. 1: LIPS legislative bill access service is currently offered to Legislators and state government agencies for $100 per year.
Service Initiative No. 2: LIPS legislative bill access service is currently only offered to Law firms that contract for the service for $2,000 per year. So far, only law firms have signed up at the present $2,000 annual subscription rate.
Service Initiative No. 3: Using the "Utah Information" gopher menu item on the INTERNET, Utah's citizens can access both enrolled bills and all bills for the 1993 and 1994 legislative sessions. The 1995 legislative bills are also currently available, usually within 24 hours of their formal introduction into the Utah Legislature. Utah Information is located at the 1 / Off Campus Information / State of Utah gopher address on INTERNET.
Service Initiative No.4: The Legislative Tracking System is currently available for use within the Governor's office and for some state agency directors.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Provide electronic access to:

1. Monthly schedules of Legislative Interim Committee meetings.
2. Copies of agendas and associated literature or other items sent with the Legislative Interim Committee meeting announcements.
3. Copies of minutes of the meetings.

For the citizens of Utah, make the above items electronically available on:

Service Initiative No. 1: An INTERNET gopher server.
Service Initiative No. 1: An electronic bulletin board (BBS).

Expected Benefits

Utah's citizens have a right to know when Legislative meeting will occur, and the topics that will be discussed including copies of any handouts to be distributed at the meeting to attendees, and copies of minutes of the meetings after they have been held.

Who is Responsible

Service Initiative No. 1: Office of Legislative Research & General Counsel / University of Utah
Service Initiative No. 2: Legislative Research & General Counsel / Division of Information Technology Services

Status as of December 1995

In Process: This issue is being considered by the Legislative Information Committee. Once their approval is given, the project can move forward.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

1. INTERNET electronic access to the 78 volume Utah State Code and the Utah State Constitution for the citizens of Utah.
2. "Bulletin board" (BBS) electronic access to the Utah State Code and the Utah State Constitution for the citizens of Utah.

Expected Benefits

Improved government services to Utah's citizens and business community.

Who is Responsible

1. Legislative Research & General Counsel / University of Utah
2. Legislative research & General Counsel / Division of Information Technology Services

Status as of December 1995

Currently Available for Use: Using the "Utah Information" gopher menu item on the INTERNET, Utah's citizens can access both the current version of the 78 volume Utah State Code and the Utah State Constitution. Utah Information is at the 1 / Off Campus Information / State of Utah gopher address on INTERNET.

The Status of Electronic Highway Services in Utah

(Based on information published in Utah Courts Information XChange, An Electronic Information Counter, published by the Administrative Office of the Courts)

Executive Summary of Service / Initiative

Provide electronic access to information filed in Utah's Court system using one of two alternate methods:
1. An electronic bulletin board system (BBS) for general access.
2. Wide Area Network access for high volume users.

Expected Benefits

Electronic accessibility to Court information is more efficient and should reduce costs, both to the information providers (courts) and the information users.

Who is Responsible

For XChange: Administrative Office of the Courts, 230 South 500 East, Suite 360, Salt Lake City, Utah, 84102 (Eric Leeson, 801-578-3831) / Zmax Computer Solutions Inc.

For Wide Area Network access into the Utah Court System, contact Charmaine Malan at 801-578-3373 or Alan Asay at 801-578-3939.

Status as of December 1995:

Currently Available for Use: By dialing 801-533-3907 and using a computer with a modem, users can dial XChange. Modem settings should be None, 8,1, and full. First time ,and low volume users are allowed 20 minutes free use by login in as "public". More frequent users can subscribe for $ 30 per month. To subscribe to XChange, contact the Administrative Office of the Courts, 230 South 500 East, Suite 360, Salt Lake City, Utah, 84102. Currently 90% of Utah's state-wide caseload is available using XChange. Weekly reports available include (1) Civil Case Pending Reports, (2) Disposition Close Out Reports, (3) Appellate Court Opinions, and (4) Tax Lien Reports.

In Process: By May 1995, an additional 7 % of Utah's caseload will also be added, making 97% available electronically.

By December 1995, the remaining 3 % is planned to be available, making 100% of Utah's caseload available.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

On-line no-cost INTERNET access available for Utah's citizens at :
Service Method No 1: Utah's libraries throughout the state.
Service Method No 2: Higher Education facilities.
Service Method No 3: Public Education facilities - 733 Utah high schools, middle schools, special schools, and elementary schools.
Service Method No 4: State and local government office work stations (business use only).
Service Method No 5: The Salt Lake Tribune On-line.

Expected Benefits

Vast amounts of government and business information is made available by the US government, higher education, business, other state governments, and many others on the INTERNET. A direct connection INTERNET user does not incur INTERNET usage charges, so information needed for state government business is immediately available at no usage cost. (For a more complete description of Internet services, see that section in this document).

Who is Responsible

Service Method No. 1 through 4: Division of Information Technology Services (Outstanding Electronic Highway RFP)
Service Method No. 5: The Salt Lake Tribune.

Status as of December 1995

Currently Available for Use:

Service Method No. 1: No-cost INTERNET access is currently available at several public libraries throughout the state: (American Fork, Brigham City, Cedar City, Davis County (main library only), Delta, Logan, Mount Pleasant, Orem, Park City, Price, Provo, Salt Lake City (and some branches), Spanish Fork, Springville, Washington County and branches, and Weber County). In February 1995, Davis County's branches, Ephraim, and the rest of Salt Lake City's branches will have Internet access.

Service Method No. 2: No-cost INTERNET service is currently available for thousands of higher education students at the following colleges and universities in Utah: University of Utah, Utah State University, Southern Utah University, Dixie College, and Snow College. Without INTERNET gophers, it is also available at Utah Valley State College and Weber State University. (BYU, a private university, also has INTERNET service, including its own gopher.)

Service Method No. 3: No-cost INTERNET service is currently available at East High School and the Iron County School District.

Service Method No. 4: ITS currently has 7 class B Internet addresses and issues IP addresses for state agencies. In February 1994, ITS began using an Internet Domain Name System. Many state government employees currently have the following Internet services at their work stations within state office buildings: Mosaic, Gopher, Telnet, Veronica, FTP, Usenet, WAIS, WWW, Archie, and Internet E-mail.

In Process:

Service Method No. 1 (improvement and expansion at Libraries):

The dates that this service will be available will be determined by the currently outstanding RFP, responses for which were due and received on December 13, 1994 and are currently being evaluated. Several locations have low speed access, as indicated above. This RFP will provide high speed access.

With this, and other library initiatives, by mid 1995, 85% of Utah's population will have Internet access available using the Utah Library Network.

Service Method No. 2 and No. 3 expansion:

The above referenced RFP will accomplish this for Utah's remaining higher education and public education facilities.

Service Method No. 5: The Salt Lake Tribune On-line will provide free Internet access through their dial-up connection in early 1995.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Make off-line, no-cost INTERNET service available to Utah's public school system educators throughout the state. This is the UTAH LINK project funded in the last Legislative session.

Expected Benefits

Until all the school buildings throughout the state can be connected to the WAN, this initiative will make INTERNET service available in late 1994 to school teachers. By using dial-up connections with modems using existing phone lines, Utah's school teachers will be able to use INTERNET resources and services. Some very remote schools in Utah will continue to have dial-up access after most schools are direct connected. Also, dial-up access lines for teachers will continue to be available in addition to the direct connects into the schools are installed.

UtahLink will provide access to world-wide libraries, video-on-demand, and courses-on-demand.

Who is Responsible

Utah Education Network Dial-Up Network Committee / Utah State Legislature

Status as of December 1995

In Progress: The Utah Legislature funded this project for FY95. The UEN Dial-up Network committee has been actively working on UtahLink and expect to have this service available by November 1994. Local telephone access to INTERNET services will be available through 76 modems located throughout the state. The 76 access lines will be distributed as follows: Logan (7), Brigham City (4), Ogden (10), Salt Lake City (20), Orem (10), Price (4), Ephraim (4), Park City (4), Cedar City (6), St. George and Blanding (4) , plus three 800 number sites.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / InitiativeExpected BenefitsWho is ResponsibleStatus as of December 1995 low cost commercial Internet access service available to Utah's citizens. In addition to a computer with a modem, TCP/IP, SLIP, and PPP protocol software is required, but provided by the INTERNET service provider. The provider also supplies a front end software (preferably GUI based) for installation on your computer.
Use of a local INTERNET access provider allows Utah's citizens modem access to INTERNET service without incurring long distance telephone toll charges if an out of state service provider was the only source available. (The INTERNET portion of use is normally free of a timed service usage charge.)1. Utah Evergreen Internet (801-350-9400).
2. XMission (801-539-0852).
3. Microsystems
(801-532-0316).
4. Internet Direct (801-578-0300)

Currently Available for Use:
These three local INTERNET service providers currently provide local access.

The lowest level of INTERNET service (dial-up) costs $204 to $468 per year; dedicated line service costs $4800 to $18,000 per year (T-1), plus set-up and equipment charges for dedicated lines.

INTERNET services usually offered by off-line commercial providers usually include INTERNET E-Mail, FTP, Gopher, Telnet, Usenet Newsgroups, UUCP, Mosaic, and World Wide Web. commercial Internet access service available to Utah's citizens.An alternative full service INTERNET access method, but some do not provide a local telephone access which will increase costs to the user. For example, some connect through large cities in New York, Texas, or other states, causing the user to incur long distance call charges. However, The latest release of Pipeline offers a SprintNet connection. 1. The Pipeline (212-267-3636).
2. Netcruiser (408-554-8649).
3. Netcom.
4. Notis
5. MKS
6. AlternetCurrently Available for Use: These national Internet access services are available for use.. E-Mail and other INTERNET services available to Utah's citizens through national, on-line commercial services. (Some of these services only have INTERNET E-Mail service instead of complete INTERNET service, and also charge a per transaction usage fee and connect time charges to their service.)These national services offer many other resources besides INTERNET, but some have only expanded INTERNET service to include INTERNET E-mail in addition to their own E-mail and limit other INTERNET services provided. Also, although they usually provide a local access number to their service subscribers, these providers usually charge a per minute usage fee for all connect time.1. Compuserve Info. Service.
2. GEnie (1-800-638-9636).
3. America On-Line (1-800-827-6364 Ext 4079).
4. Delphi (1-800-695-4005).
5. Dow Jones News Retrieval with MCI Mail.
6. Prodigy Interactive Personal Service.Currently Available for Use: These national limited function Internet access services are available for use.

All transactions that effect financial institutions (banks, credit unions, savings & loans, etc.) need to include "road map data", known as a "routing number". Each financial institution uses a "routing number" which is an organized series of numbers to specifically identify the individual's account within the appropriate type of financial institution and the servicing Federal Reserve Bank location within the 12 US Federal Reserve Districts. With the routing information, any financial transaction should find its way to the correct account, anywhere in the United States. Next, the trick is to encode everything with the routing information. Checks are printed with micro-encoded routing numbers that can be read by high speed electronic check processing equipment. Electronic forms of payment services transactions on the electronic highway do the same thing, but with much higher efficiency and lower cost, as described below. The types of electronic payment transactions are described below:

Automated Clearing House (ACH) transactions are completely electronic forms of asset transfers, like a "paperless checks". They are generally used for recurring electronic transfers of assets between financial institutions. Recurring transactions are defined as transactions between two parties that are routed to the same account, usually at specified periodic time intervals. ACH transactions can be either debits or credits (adding or subtracting money to or from designated accounts). The most common ACH transaction that people are probably familiar with is the automatic payroll deposit. In the ACH payroll transaction example, ACH transactions electronically reduce a central payroll account at one financial institution and re-distribute the assets to many other accounts at many other financial institutions.

ACH transactions cost significantly less to process per transaction than using paper checks because, once established, ACH transactions require minimal human intervention except to implement changes. Many forms of ACH transactions exist. Some examples are: automatic payroll distributions; electronic child support payments; electronic monthly payment to utility companies (natural gas, electricity, telephone, etc.); cash concentration systems; electronic monthly payment of loan payments or monthly insurance company payments; electronic return items (similar to check return items), etc. Because of their recurring nature, financial institution routing information is manually entered once when the ACH transaction is established, then the information is electronically re-used during each succeeding time period unless a change has occurred and been input into the ACH system. For example, your payroll deposit always goes to the same account unless you manually intervene to change its routing. Because of the very minimum amount of human labor effort needed once the routing data and transaction amounts have been established, the per transaction costs of ACH are very minimal. ACH transactions enter the system either through direct on-line connections between financial institutions and the ACH clearing house (Federal Reserve Bank) or the electronic exchange of ACH file tapes. The ACH network is national and international in scope and inter-connects most financial institutions. ACH is a very fast, highly secure and reliable, and very low cost electronic asset transfer service.

An electronic funds transfer (EFT) is a non-recurring electronic transfer of assets. EFT transactions differ from ACH transactions in that EFT transactions cost more than ACH transactions to process because the financial institution routing information must be manually entered into an electronic funds transfer system. An example of an EFT is a one-time transfer of assets to someone in another city to pay for a purchase, or send money to a relative. EFT is a very fast, highly secure, relatively low cost electronic asset transfer service.

These are more commonly known as "credit cards", such as Master Charge, Visa, etc. When a consumer desires to purchase goods or services, a magnetic strip card (credit) is often used. The purchaser of the goods or services has made pre-arrangements with a financial institution for a loan (the credit card account). The financial institution provides the consumer with a plastic card with a magnetic strip that contains the encoded financial institution routing information within the magnetic strip. When the services are to be paid for, the consumer presents the magnetic strip card (credit) to the retail store cashier, and the cashier places the plastic card in a device which reads the routing information on the card. An electronic transaction takes place where the magnetic strip card device reader electronically transmits a request to the financial institution's clearing house to determine if the consumer has a remaining line of credit on their loan account (credit card account). The data is received and processed at the financial institution and a return response is electronically sent back to the magnetic strip card reading device indicating to the cashier whether to accept or reject the requested transaction. In some cases, a unique transaction authorization code is appended to the transaction records. If acceptable, the cashier completes the transaction and the retail establishment is compensated by the financial institution providing the credit to the consumer. The consumers outstanding loan amount with the financial institution is increased for the amount of loan granted to pay for the purchase. Settlement between the consumer and the financial institution occurs is a separate transaction when the consumer pays their monthly magnetic strip card (credit) bill. Data is not entered onto the magnetic strip card when a transaction occurs. (Note how this differs from the smart cards later in this section).

Magnetic strip cards (credit) also allow consumers to shop over the electronic highway, either by phone, FAX, on-line service(s), or other methods. Consumers supply account numbers, expiration dates, and names to purchase goods or services from retailers using various forms of electronic communications to market their products. This method is not secure.

Magnetic strip cards (credit) are also extensively used by other retail providers of goods or services. Examples of these are petroleum outlets, department stores, and many others. These transactions differ from the above because they occur between the retail outlets and the central credit office clearing houses of the retail firms, bypassing financial institution involvement.

Magnetic strip cards usually have two data tracks. Track 1 can contain 79 characters of data. Track 2 can contain another 40 characters of data. Total data contained is about 119 characters. (contrast this with the 1,000,000 characters of data possible on smart cards - discussed later in this section).

Magnetic strip cards (debit) are more commonly known as "debit cards" or "checking cards". The magnetic strip card (debit) functions in a manner quite similar to the transaction flow of the magnetic strip card (credit), except instead of a loan transaction occurring, assets transfer from the consumer's checking or savings account to the checking account at the retailer's financial institution. It is not a loan, unless the financial institution grants overdraft protection along with issuance of the card. The debit card is used in lieu of writing a check. The debit card transaction is a non-recurring asset transfer with the financial institution routing data embedded into the magnetic strip of the debit card to allow high speed transaction processing efficiency.

Currently, there are about 18 million debit cards in circulation that have been issued by 1,458 financial institutions. By the end of 1995, 45 million debit cards are expected to be in circulation, so a significant increase in the next 15 months is predicted to occur. Financial institutions are also currently stressing the use of combined Debit Cards - ATM Cards instead of issuing just debit cards.

An electronic benefit transfer (EBT) is a hybrid electronic payments service which combines an ACH asset transfer with use of a magnetic strip card (debit) transaction. A federal or state means-tested program, such as the food stamp program,

establishes a checking account with a debit card for the benefit of the program benefit recipient. At periodic interval (usually monthly), the amount of the program benefits are provided as assets. This transfer originates in the financial system electronically as an ACH asset transfer from the US government's account managed by the US Treasury / local Federal Reserve Bank. This transaction transfers the designated amount of assets to the financial institution account of the means-tested program benefit recipient. To access these assets and make purchases, the program benefit recipient is provided with a magnetic strip card (debit) which is used in retail stores in the same manner as other magnetic strip card (debit) transactions described above.

An automated teller machine (ATM) card is neither a debit or credit card, the ATM card allows a consumer to use financial institution provided ATM devices to perform many different types of transactions. Examples include withdrawing cash, transferring assets between accounts of the same financial institution, obtaining small cash loans, making monthly loan or credit card payments, or conducting account balance inquiries. The consumer places the ATM card in the device, and enters a secret security access code (PIN number) into the device to authorize the desired type of transaction(s). The personal identification number (PIN) is provided to consumers when the ATM cards are issued by the financial institution. The ATM card has information embedded into a magnetic strip included as part of the card.

ATM devices are located at financial institution locations, in stores, malls, offices, and several other convenient locations and form an electronic highway between financial institutions. Thousands of financial institutions have also formed cooperative networks so that ATM machines of one financial institution accept ATM cards issued by other financial institutions. These types of transactions are called "foreign ATMs" and usually charge a convenience fee for performing the service. This practice allows ATM card users to use thousands of ATM machines located throughout the United States. For example, if you are on a trip in California and want to use an ATM card issued by a Utah financial institution, the transaction can be done for a fee, usually $1.

A smart card has a micro chip embedded within the card to hold large amounts of information. Smartcards can hold up to 1 million characters of data, compared to 119 characters of data possible with magnetic strip cards. Smartcards may also include electronic asset balances that are recorded and retained in the micro chip. The micro chip would be read by smartcard readers at retail outlets, and the electronic assets needed for the purchase would be deducted from the amount recorded on the Smartcard's micro chip, with the remaining electronic asset amount retained as a balance on the smartcard. When used up, the smartcard could be taken to the financial institution and "refilled" with more electronic assets. Note that smartcard transactions would not transmit data to a central processing and authorization site like a magnetic strip card would require. This allow s faster transaction processing in retail outlets because all transactions would be authorized or declined at the retailer's smartcard terminal.

Smart cards are used by financial institutions, government, transportation companies, education institutions, the health care industry, and several others.

The smartcard micro chip may include significant amounts of information about you, such as your medical history, third party payer information for health care providers, etc.

Using touch tone telephone devices to remotely interact with financial institution computers, selected types of financial institution transactions may be conducted. This is known as interactive voice processing, and the service is provided by financial institutions using names such as "AccessLine", "TellerPhone", "Firstline", etc. The potential types of transactions possible include making loan or credit card payments from checking or savings accounts; checking individual transaction information, such as individual check clearings, credit card transaction clearings; savings, checking, or loan account balance inquiries, ordering checks or other services; and several other types of services. Security is controlled using PIN numbers.

Electronic Data Interchange (EDI) is a completely electronic purchasing and payment system used by government and businesses with their trading partners. When goods or services are needed, electronic quotes are issued to potential bidders. Quotes from potential suppliers are submitted electronically to the EDI data management site. Computer programs search the quotes, identify the vendors that best meet the organizations purchasing selection criteria, and electronically issue the order to the selected trading partner. Once the goods or services are satisfactorily received, receiving report data is entered into the system, and after appropriate review and on the correct payment data, an ACH electronic payment is sent to the trading partner completing the business transaction. Some EDI systems use a third party intermediary, known as a Value Added Network (VAN). Some EDI systems tie heavily into inventory manufacturing systems or electronic point of sale systems in retail outlets, allowing "just in time" inventory management which reduces inventory costs. EDI systems save business and government entities using them significant amounts of administrative costs and overhead. Also, since a much larger trading partner base can exist, the EDI bid solicitor is able to receive and analyze many more competitive bids than a non-EDI bid solicitor, thus promoting more competitive bids and lower overall acquisition costs for the goods or services that they need. Providers of goods or services on the EDI network have significantly larger customer bases, thus expanding profits compared to non-EDI network providers.

Most US government securities are held in "book entry form". This means that when US Treasury Notes, US Treasury Bonds, US Treasury Bills, or other securities are purchased, the purchaser does not receive a paper certificate to represent the asset. Instead, an entry is made to the electronic records at the US Department of the Treasury or a local Federal Reserve Bank which indicates that a financial institution, business, or individual owns a US government security. So, the whole trillion dollar federal deficit is nothing more than the sum of all the book entry security entries outstanding at any point in time. This also makes transfers, new issues, and retirements easy to accomplish using electronic securities systems managed by the Federal Reserve Bank(s) and the US Department of the Treasury.

Other types of electronic securities transfer systems also exist within the private securities industry.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement an electronic benefit transfer (EBT) system for the following state managed programs:
a. Food stamp benefit program.
b. Aid to Families with Dependent Children (AFDC) program.
c. General Assistance Program.
d. Public Assistance Child Support - (PA-IV-D) Program.

The "UTAH HORIZON PROJECT" is a program whereby designated financial institution accounts of qualified program recipients will receive assets electronically using automated clearing house (ACH) electronic transfer of assets. The federal government will use electronic ACH deposits to transfer the appropriate amount of assets to bank accounts of food stamp, AFDC, etc. program benefit recipients. To convert the ACH deposits to food, the recipient will use magnetic strip cards (debit) at point of sale magnetic strip card terminal reader devices located in retail food outlets. To them, this will be just like any other customer using a bank debit or credit card, except the payment will transfer electronically to the store for the amount of the sale. Key milestone dates for the Utah Horizon project are:
1. By October 1995, the Utah Horizon project will implement a pilot program in Wasatch, Summitt, and Utah counties. The pilot will last approximately 3 to 5 months, then the program will be expanded state-wide.
2. By November 1996, complete implementation of the "Utah Horizon Project" in the rest of the state.

Expected Benefits

1. Food stamp recipients currently receive benefits in the form of paper food stamps that must be of high quality to preclude counterfeiting, but are only usable once, then canceled and destroyed by Federal Reserve Banks. Electronic delivery of benefits will reduce program costs and allow electronic analysis of data on food stamp benefit recipients and the retailers that accept food stamps, improving fraud investigations. Benefit recipients, and their children, will also avoid potential family embarrassment of using paper food stamps in retail outlets.
2. Other program benefit recipients will have similar improvements.

Who is Responsible

Department of Human Services (Office of Family Support) (Clyde Terry 538-3969)

Status as of December 1995

In Process: On October 1, 1995 the "Utah Horizon project went live for the State, clients, merchants, and financial institutions in the pilot program area: Wasatch, Summitt, and Uintah counties.

By November 1996, the project should be implemented in the rest of the state.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

“Access Utah” is a new magnetic strip state services authorization card which will be issued by the Utah Department of Public Safety. Initial use will be as a Drivers License, butother state agencies can magnetically encode data on the card’s magnetic strip. For example, libraries, colleges and universities, etc can use the Access Utah card to enable users to access state or local government services.

Expected Benefits

Who is Responsible

Utah Department of Public Safety (contact Roland Squire, Director, MIS Division, 801-965-4385)

Status as of December 1995

In Process:

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement as close as possible, 100 % use of electronic payroll disbursements in Utah. In Utah during 1993, nonagricultural payrolls totaled $ 17.7 billion. These are typically disbursed weekly, bi-weekly, semi-monthly, or monthly and include disbursements to a wide variety of payees (financial institutions, insurance providers, federal and state tax agencies, etc.). Private non-agricultural payroll totaled about $ 14 billion.

Expected Benefits

1. Electronic payment systems (ACH) cost less to process than manual payment methods (checks).
2. Electronic payments offer higher security and more convenience for users.
3. If a large sector of Utah's economy would implement use of electronic payments, administrative overhead costs within the state's economy could be reduced.

Who is Responsible

Private organizations / Utah's financial institutions

Status as of December 1995

Currently Available for Use. Contact your employer's Human Resources or Accounting (Payroll) Department to sign up for this service.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / InitiativeExpected BenefitsWho is ResponsibleStatus as of December 1995. ACH transactions reduce transaction processing costs compared to using paper checks / warrants. ACH payroll distributions are more convenient for employees. Department of Administrative Services (Finance) (Mark Austin 538-3023)Currently Available for Use: This service is already used by Utah state government employees on a voluntary basis. As of April 1995, 69 % of state employees use automated payroll deposits.Electronic .ACH and EFT transactions reduce transaction processing costs and are faster compared to using paper checks / warrants.

This results in optimizing Utah state government's cash management and investment transfer practices in a highly secure and efficient business environment.
Utah State Treasurer (Ed Alter, State Treasurer 538-1042 or Robert Kirk, Manager, 538-1462)Currently Available for Use: This service is already used by Utah state government and the medium used, as follows:

Investments: 95% are done using ACH (all except local CDs)

Public Treasurer Investment Fund: 90% of incoming are done using ACH; 90% of outgoing transfers out use EFT.

Semi-annual Bond Payments: 100% are done using EFT.

Sales Tax Disbursements and Collections: 100% are done using ACH.

FICA/Federal Income Tax Withholding / and other bi-weekly payroll related transactions: 100% are done using ACH.

Receipt of US Federal Grant Assets: 90% are done using ACH.

Daily Cash Concentration Sweeps and consolidation into single investment account: 100% are done using EFT.Electronic payment methods for program benefit recipients.ACH transactions reduce transaction processing costs compared to using paper checks / warrants.Department of HealthAt present, all payments are done using paper checks / warrants and electronic payment methodologies are not used. However, a new project, called "Health Passport" should implement EBT / EFT type payments.Electronic payment methods for benefit recipients.ACH transactions reduce transaction processing costs compared to using paper checks / warrants.Department of Health (Sal Naulaui 538-6611)At present, all payments are done using paper checks / warrants and electronic payment methodologies are not used.Electronic payment methods for recipients and payments.ACH transactions reduce transaction processing costs compared to using paper checks / warrants.Utah Board of Regents / Higher Education (Carl Empey 321-7286)Student Loan Applications & Payments:
Utah's Board of Regent's student loan program processes $200 million per year of student loan applications. Of these, 80% of the student loan applications are done electronically. Student loan disbursements are 60% EFT, but payments received on outstanding student loans are not done electronically. However, a plan to implement electronic loan payment is expected to be in place within 12 months.Electronic payment methods for program recipients.ACH transactions reduce transaction processing costs compared to using paper checks / warrants.Department of Employment Security (James Finch 536-7870)At present, all payments are done using paper checks / warrants and electronic payment methodologies are not used.Electronic payment methods for program recipients.ACH transactions reduce transaction processing costs compared to using paper checks / warrants.Utah State Industrial Commission (Erie Boorman 530-6820)Payments are made by State Finance using paper checks / warrants, so electronic payments are not used.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Use electronic monthly payments (ACH) to pay for recurring providers of goods and services or monthly loan payments. These can cross financial institution boundaries.

Expected Benefits

An electronic monthly payment method for services (such as electronically paying monthly utility bills, insurance payments, mortgage or vehicle loans, etc.) is easier for the customer and improves accounts receivable collection efficiency for the business. Also, by reducing transaction processing costs to the service providers, lower costs or higher productivity will result in the economy. For customers, electronic payments offer an improved quality of life because the work is done automatically as long as the balance needed is in the account on the date of transfer.

Who is Responsible

Utah's Financial Institution(s) (Banks, Credit Unions, Savings & Loans, etc.) / Utah's Recurring Providers of Goods & Services, such as utility companies, insurance companies, mortgage loan payments, and other monthly payments such as auto loans, etc.

Status as of December 1995

Currently Available for Use.

This service is already available for use by Utah's citizens and others doing business in Utah.

Contact your appropriate lender to implement this service.

Contact your appropriate insurance carrier to implement this service.

Monthly Utility Payments

: To set up ACH payment, known as US West's "Automatic Payment Plan", call 1-800-244-1111(home) or 1-800-603-6000 (business) and they will send you the forms.
: To set up ACH payment, call 801-532-3131 and they will send you the forms for "Electric Check" services.
: To set up ACH payment, call your local city public works department.
: Questar does not presently offer an ACH payment methodology for its customers, but is considering it.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Businesses or non-profit organizations with operations geographically located throughout the United States or world may use a "lock box" systems to collect cash receipts / payments within a designated local area of their sub-unit's operations. The cash and check payments are deposited to a bank that is local to the operation. Consequently, some businesses may have hundreds of bank accounts accumulating non-interest bearing account balances. To improve cash management and return investment on assets, these small amounts need to be concentrated into a single investment account at a financial institution, usually located at the head office of the business or non-profit entity.

An ACH cash concentration system is a regular periodic electronic scan and transfer of these account balances (or amounts over a designated amount) in all financial institution accounts owned by a business or not-for profit entity. Assets in the accounts over a specified minimum amount are electronically withdrawn using ACH electronic transactions and then electronically re-deposited into a cash concentration account for centralized cash management and investment purposes.

Expected Benefits

This significantly reduces costs, and simultaneously improves investment returns for the business or not-for-profit entity.

Who is Responsible

Utah's Financial Institutions (Banks, Credit Unions, Savings & Loans, etc.) / Federal Reserve Banks

Status as of December 1995

Currently Available for Use. ACH cash concentration services are currently available for use - see your financial institution.

The Status of Electronic Highway Services in Utah

Executive Summary of Services / Initiative

1. Develop a World Wide Web server for library services.
2. Provide INTERNET services to the state's 52 public libraries.
3. Provide a database(s) of 1,400 publications for reference, and electronic searching and document delivery.
4. Develop an electronic database of all State of Utah government publications.
5. Provide electronic reference databases of major Utah newspapers.
6. Provide other electronic library services, such as the ability to electronically research catalogs of books and other reference materials.

Expected Benefits

The above actions should make library and INTERNET resources available to all.

Who is Responsible

Department of Community & Economic Development (Amy Owen, Director, State Library Division, 466-5888) / University of Utah Marriott Library / all other Utah libraries / Library/Data Communications Committee of the Utah Education Network (Wayne Peay, Chair, Eccles Health Sciences Library, 801-581-8771).

Status as of December 1995

Currently Available for Use:

Initiative No. 1: The World Wide Web server of library services is available for use at Internet address http: / www.state.lib.ut.us. Other WWW servers are available at Utah colleges and universities.
Initiative No .2: Internet services are available at 16 public libraries in the state. Others are in progress.
Initiative No. 3: A database of 1,400 publications is licensed for public library access through the State Library. Provided by UMI, this periodicals database includes electronic searching and document delivery capability.
Initiative No .6: The Marriott Library, University of Utah, currently offers online public access catalog services, called UNIS. By dialing 581-5650 with a modem (settings: 8,1, none, full), a library service user can access the UNIS online catalog. Other services include LIBS, which is a selection of online catalogs from other libraries. Additional information is also available on the U of U's Internet Gopher server. Other college and university libraries have similar services.

In Progress:

Initiative No .2: The fiber optic RFP which was returned by vendors December 13, 1994 should address library connections to the state's wide area network.
Initiative No .4: This initiative is in progress, and legislation will be introduced in the 1995 Utah Legislature (HB 1) dealing with agency responsibilities / cooperation on electronic copies of publications prepared by state agencies required to be filed at the State Library.
Initiative No. 5: In January 1995, the Deseret News should be electronically available at libraries. Also, the Salt Lake Tribune may be electronically available later in 1995.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Electronic settlement and payment system for health care services. Develop standards and obtain agreement among health care providers and third party payers for the electronic interchange of digitized health data necessary to support payment by third party health care providers.

Expected Benefits

Health care administrative costs approximate 25% of total costs for health care. Electronic payment for health care services will significantly reduce the administrative costs. The estimated savings from electronic claim form filing could be $50 million per year.

Who is Responsible

Utah Health Information Network (UHIN) (Bart Killian 531-1340).

Status as of December 1995

Currently Available for Use. In July 1994, UHIN began production use of the new system with six hospitals, several physician offices, and insurance carriers.

In Progress: Other hospitals in the state are coming on-line January 1, 1995 and the UHIN should implement electronic health care settlement payments state-wide. Utah is the leader in the nation in this area.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement "telemedicine" in Utah. Telemedicine includes:
1. Tele-Radiology (the electronic transmission of X-Rays between hospitals, clinics, medical professional offices as needed.
2. Consultation between medical professionals or between medical professionals and patients via video conferencing.
3. Psychiatry services.
4. Electronic monitoring of patients using remote devices.
5. Home health care medical services delivered via electronic devices.

Expected Benefits

1. Reduced transportation costs.
2. Reduced medical care costs.
3. Improved services to medical care patients.

Who is Responsible

Governor's Committee on Telemedicine / Utah Health Information Network (Jan Root, Ph.D. (801-531-1340) or G.N. Baldwin, M.D. (at Castleview Hospital in Price, Utah)

Status as of December 1995

Currently Available for Use. Limited tele-radiology services are enabled from Castleview Hospital in Price, Utah and select neighboring medical offices. This is a pilot project.

In Progress: A larger pilot project to link the University of Utah hospital with a hospital in Beaver, Utah is in early planning stages, depending on Legislative funding for the pilot.

Executive Summary of Service / Initiative

EDI is a completely electronic purchasing / payment system for conducting business transactions with trading partners. Since surveys indicate that 20% of business overhead costs are due to paper handling, EDI offers a significant opportunity to improve business practices. In the past 10 years, labor costs have been rising while costs for microcomputer processing power and telecommunications costs have been falling. EDI leverages these cost factors / trends to your advantage.

International standards exist for EDI transactions. In the US, the ANSI X12 standard established standards for over 300 types of transactions (purchase orders, invoices, freight bills, etc.). The UN-EDIFACT standard was adopted as the EDI standard by Europe. In 1996, ANSI will no longer develop new ANSI X12 EDI standards and will begin converting to the UN-EDIFACT international standard.

Expected Benefits

EDI offers the following benefits: (1) Some savings in personnel costs; (2) an average 50% reduction in error rates; (3) improved customer service; (4) reduced inventory requirements and reduced inventory costs; (5) fewer stock outs of inventory; (6) reduced paperwork handling costs; (7) faster payments which allows fast payment discounts or improved cash management by deferring a faster payment. The most recent surveys conducted by Professor Ned Hill, BYU, indicate average savings experienced by 2,000 businesses from implementing EDI as compared to prior EDI implementation averages to be $3.21 saved per document previously processed; over 60% reductions in error rates, and cycle time reductions of over 50%. AS an example, Toys R Us processed 220,000 invoices annually prior to implementing EDI. Two years later after implementation of EDI, Toys R Us processed 350,000 invoices annually without an increase in staff responsible.

How to implement EDI in your organization

To implement EDI, call EDI Spread the Word and they will refer you to sources of the special EDI contracts with vendors and EDI translation software that is needed. The EDI translation software maps data from your business organization's database into a flat file and sends it to a formatter within the EDI software. Next, the EDI translation software formats the flat file into a standard EDI format. Finally, the EDI translation software sends via communications links the formatted EDI data to a value added network or trading partner.

EDI Spread the Word (telephone 214-243-3456) is a business organization in Dallas, Texas that publishes the EDI Yellow Pages which costs $35. The EDI Yellow Pages list 70 vendors that produce and sell EDI translation software ranging in price from $300 to $100,000, depending on the computer system that it will operate on (mainframe computers are the high end of the price range, PCs the low end.) The EDI Yellow Pages also includes current listings of companies using EDI technology and 15 value added network service providers (such as AT & T, GE Information Services, IBM Advantis, OrderNet, MCI Network, etc.).

Status as of December 1995

Currently Available for Use. EDI services are currently available for use and are used by businesses in Utah (PacificCorp, Morton International, JC Penney, and several others). The US government is currently using EDI and will require mandatory use in 1996. Utah state government is also converting to EDI.

(Information provided as a public service courtesy by Ned Hill, Ph.D., BYU faculty, an international EDI expert)

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Completely electronic purchasing / payment system for goods and services needed by state government. This should be a fully ANSI X12 / UN-EDIFACT standard compliant EDI system for state government use.

Expected Benefits

EDI electronically inter-connect a business entity with its suppliers of goods and services. Significant cost reductions are achieved by the electronic analysis and exchange of bid information, purchase order data, receiving reports, and vendor payments.

Who is Responsible

Department of Administrative Services (Finance & Purchasing Divisions) / American Management Systems (AMS) Corporation

Status as of December 1995

In Process: By July 1994, the State of Utah implemented into production the first phase of FI-NET, the state's new state government accounting system. This system is based on version 8.0 of the Government Financial System (GFS) product marketed by American Management Systems, Inc. (AMS). Version 8.0 of GFS does not provide EDI functionality. By the end of 1995, AMS will add ACH vendor payment functionality to version 9.0, which Utah will install by the end of 1995. Version 10.0 of GFS will implement full EDI capability.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

The US government buys from the private sector approximately $200 billion per year of goods and services, which Utah businesses have the opportunity to bid on.

The US Government has already developed a completely electronic purchasing and payments system known as Electronic Data Interchange (EDI). If you want to sell goods and services to the US government, by 1997, you must use EDI and your business must be EDI enabled or your business will be shut out of the US government procurement market.

Hill Air Force Base, Utah (HAFB) developed the EDI system for the US Air Force and US Department of Defense (DOD). DOD is way ahead of other federal government agencies, so they will lead implementation of EDI and electronic commerce for the US government. Consequently, the DOD (and possibly the whole US government) will process all EDI through two national sites. HAFB's Data Processing Megacenter is one of the two designated national EDI sites, making Utah one of two key EDI site managers for the US government.

By January 1997 the US government plans to implement their electronic commerce system throughout the US government.

Expected Benefits

The US government spends $200 billion per year for products and services. Electronic commerce capability with the US government will allow Utah 's small businesses to compete for US government business. Electronic commerce will also reduce the cost of goods and services procured because a wider competitive bidding market source will exist. For example, firms in southern Utah will be able to bid for contracts to be issued in Washington D.C. or other US government procurement locations across the nation.

Who is Responsible

US Government (Federal Electronic Commerce Acquisition Team of the Office of Federal Procurement Policy). For additional information on US government EDI, call 1-800-EDI-3414.

Status as of December 1995

Currently Available for Use. This EDI system is up and running. EDI transactions are optional for now, but will go mandatory for all types of goods and services within twenty-six months. This phase-in of EDI is to enable business to gear up and become EDI enabled before they are closed out of the US government procurement market(s).

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement video arraignments at Utah's jails and courts. Instead of transporting prisoners to a court to stand before a Judge, video arraignments allow prisoners to remain in jail facilities and video conference with the judge, prosecuting attorney, and defense attorney, all at the same time (with a four-split quad video screen display unit). A video camera, microphone, speaker, and monitor is available at each end, and the suspect, attorneys, and the judge conduct court business using this two-way audio and visual communication medium. More sophisticated four way systems are also available which can add defense attorneys and prosecutors in a four way video conference with all four parties at different locations, such as the suspect in jail, the judge in court, and the attorneys in their offices or at home. Also, an audience viewing unit is also available and usually provided with the system. Video cassette units playback " advisement of rights" and all proceedings can be recorded and retained to become part of the court record. Documents are exchanged using FAX technology. The jail unit is a high security configuration to avoid damage by suspects / prisoners.

Expected Benefits

1. Since some of the jail inmates currently test positive for tuberculosis (TB),using video arraignments will allow Judges, Lawyers, and Utah's citizens doing other business in the city and county complexes to avoid TB exposure. Also, special handling needed for HIV-AIDS positive prisoners is eliminated because they are not transported outside the jail building.

2. Security of prisoners is improved by eliminating the need to body search, hand-cuff, and shackle prisoners for transportation. They stay within the jail.

3. Transportation and other costs are reduced because many inmates, once apprehended, can avoid being moved to additional courts where charges are also pending, including potential out of state arraignments.

4. Overall, Courts using video arraignment technology allow arraignments to be completed earlier than the prior method of physically moving prisoners to in-court arraignments

Who is Responsible

Administrative Office of the Courts / Court Vision Communications Inc. (805-496-5664)

Status as of December 1995

Currently Available for Use: Pilot projects are currently underway at: (1) Salt Lake County Jail / Third District Circuit Court and (2) the Layton City Second Circuit Court / Davis County Jail.

In-Progress: If the pilot project prove feasible, the technology will be expanded to other locations throughout the state.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement video conferencing for Board of Pardons and Parole hearings between the Gunnison, Utah State Prison Facility and the Board of Pardons and Parole offices in Salt Lake City. BOP hearings include BOP Commissioners, prisoners, victims, attorneys, and other interested parties.

Expected Benefits

1. This initiative will increase security because prisoners will not need to be transported for the parole hearings.
2. Improved productivity of Board of Pardons and Parole Commissioners because they will not need to travel to Gunnison, Utah. Also, some reduction in travel costs should also result.

Who is Responsible

Utah Board of Pardons and Parole / Division of Information Technology Services / EDNET.

Status as of December 1995

In Process: The 1994, Utah State Legislature approved $100,000 for video conferencing equipment to implement this. As of December 1994, it has not been implemented yet, mainly because Laurie Gustin is busy implementing the imaging system first.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

1. Implement video conferencing capability in the Legislative conference rooms of the Utah State Capitol.
2. Implement a video conferencing system for state government that will allow state employees to effectively utilize video conferencing to reduce transportation expenses by 15% by the end of 1996.

Expected Benefits

1. Governor Leavitt challenged state employees to reduce travel expenses 15% in 1996, which may be possible using video conferencing technology.
2. Video conferencing should improve productivity of state workers because they will not need to travel to some meetings that were avoided.

Who is Responsible

1. Office of Legislative Research & General Counsel / Division of Information Technology Services.
2. Division of Information Technology Services.

Status as of December 1995

Currently Available for Use. Video conferencing is currently available in limited locations within state government facilities. In the State Capitol, video conferencing is available in the Legislative Research & General Counsel Conference Room. In December 1994, Governor Leavitt will announce the new FY96 Governor's Budget Recommendations using video conferencing technology. EDNET business meetings are also held state-wide using video conferencing technology.

In December 1994, the Governor's Office implemented low cost (about $1,500 per unit) desktop PC video conferencing capability on five existing PC work stations among capitol hill area offices.

In Progress: Other state agencies plan to implement video conferencing, but so far the Legislature has not funded the project.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Utah is in the process of integrating information technology in all of Utah's 733 public schools. In addition to these, another 105 private schools within the state are concurrently initiating some programs to integrate technology in education. This summary is limited to the public school environment.

Basically, Utah is implementing technology into schools and where it is on the evolutionary path can best be identified by which model best fits each school's situation, as described below. A Phase I to Phase IV model methodology is used, with Phase I being the lowest level of technology integration and Phase IV, the Virtual School Model, the highest level.

Presently, all 733 public schools in Utah are now at Phase I. Approximately 100 schools have already advanced to Phase II. Between 6 to 12 schools in the State have advanced to Phase III. No public schools in Utah have advanced to Phase IV yet.

The long range goal of this technology integration into public education initiative is "instead of being at school at a particular time, students can be learning on demand". By December 31, 1996, Utah expects to have 90 secondary education (college) core courses available to high school students. Utah's education professional's in this area expect by the end of 1996 that 5% to 20 % of students in high school will take courses using these alternate education methods.

Each of these phases along the evolutionary path to technology based education are described in detail below.

This Phase can best be described as saying the school has a computer lab, with all or most of it's computer resources concentrated in one location. Many schools do not have the resources to utilize technology beyond this entry level. For these schools, the baseline computer technology is a lab providing students the greatest technology access with the least amount of funding. Some other characteristics of this phase are:

* Educational software has been selected for applications that fit the curriculum and philosophy of the school. A full range of software should be considered that meet specific educational objectives.

* Some teachers have been trained on the use of the software to enhance the instructional program, and they provide help for students in the lab setting.

* These schools continue to explore options for baseline lab technology. The lab generally contains only enough workstations to accommodate the software applications for individual or small group configurations. Network consideration should have been be given to allow effective resource sharing (printing options and file sharing).

* Curriculum applications at this level generally include reinforcing basic skills through drill and practice programs or integrated learning systems covering any number of subject areas, enhancing problem solving and cooperation skills through the use of simulation and other problem solving software, developing keyboarding skills, or enhancing the writing process through the use of word processing.

Funding from Utah's Educational Technology Initiative (ETI) has provided this level of technology support for all schools in Utah. However, some computer hardware implemented in the early years of this initiative is now becoming obsolete, so on-going funding of ETI is a necessity just to sustain this level.

The next step for technology implementation is to provide a school local area network (LAN), connecting each classroom. This may require retrofitting older structures to accommodate connections to various parts of the school, creating this local area network (LAN). The baseline technologies required for this model are as follows:

* Install at least one workstation in every classroom. The configuration should contain current standards for operating systems and media access, ie., multimedia compatible systems.

* Install a school-wide network backbone to provide print and file sharing; e-mail, telecommunication, and information transfer or instructional delivery throughout the school.

* Provide for renewal and replacement of both hardware and software. Base-line equipment should be upgraded or replaced as needed for curriculum applications.

* Train teachers to use workstations in the classroom for instructional and administrative purposes such as word processing, data management, spreadsheets, grades, attendance, and presentations.

* Curriculum applications at this level might include learning to use on-line information resources; enhancing organization and analysis of acquired information through the use of word processors, database managers, spreadsheets, statistical analysis programs; software support for cooperative projects involving electronic research applications, student publishing, and multimedia projects.

* Provide support for staff for maintenance, training, troubleshooting, and leadership for technology planning.

This implementation model requires greater commitment to ongoing technology integration into the teaching / learning process. Changes in role and function of both students and teachers are required for effective implementation. At this stage of technology access, student engagement, motivation, and achievement begin to increase significantly. A foundation for systemic change is possible at this level of integration.

* Install at least five or six workstations in each classroom (a minimum of one station for every five students is recommended).

* Provide school-wide telecommunications capabilities (Global network connections with full-motion video, voice and data access used to enhance learning).

* Provide one or more workstations in the school, e.g. Media Center, with multimedia capabilities for production and development of curriculum application not commercially available.

* Provide for alternative electronic instructional delivery for students who choose other options in completing course requirements for graduation, generally at the high school level.
* Upgrade existing equipment, as curriculum needs dictate, to take advantage of increased capabilities of newer technologies.

* Flexible scheduling, differentiated staffing, more effective student evaluation techniques, (e.g.. Portfolios, authentic assessment, non-graded, competency based), and curriculum changes reflecting societal priorities.

* At this level technology applications should not be an “add-on”, but rather an integral part of the learning process. Curriculum applications, therefore, might include: research using the Internet and other on-line information resources; cooperative projects that cross school, state, and / or national boundaries; using multimedia / video production capabilities for student projects; media literacy; distance learning; communication with students across the globe; collaboration with recognized experts in their field of expertise; individualized cross-curricular learning units; as well as the applications listed in previous levels.

* Provide ongoing teacher training using “just in time” or “training on demand” techniques to expand technology integration into instruction. Integration includes instructional design, multimedia development, telecommunications access, video production, delivery of curriculum via digital means, to enhance teaching and learning.

* Technology applications at this level can also provide the basis for substantial departures from traditional forms of teaching, allowing the teacher to become a facilitator of learning. Training for teachers should include the prerequisites necessary for such changes.

* Budget priorities must include maintenance for replacement of hardware and software. Funding must also provide the support staff needed to train teachers, to maintain networks and equipment, and to provide the leadership necessary for technology planning and implementation.

For several years, technology applications in society have increased more rapidly than technology applications for instruction. This trend cannot continue if we are to prepare students to compete in the society in which they are going to live and work.

The focus of the future should not be toward creating more buildings and classrooms, but toward more effective delivery of instruction. In addition to the school setting, future technology applications must include instructional access to homes, businesses, post-secondary education facilities, and other locations. The trend is clearly toward the virtual school environment for many of our students.

At the elementary school level, the bond between teacher and student, as well as the nurturing environment itself, is very important. For this reason, technology applications in the classroom are more appropriate. The virtual school environment will be more successful at levels where students can take more responsibility for their own learning, such as at the middle school and high school levels.

In this model, specific technologies (video, optical disc, online courseware, cable and broadcast TV, Internet, printed material, or combinations of these) become the primary delivery mechanisms for instruction.

* The barriers of time and place no longer exist, thereby expanding student learning opportunities.

* Students are able to learn at their own rate, in a open-entry, open-exit environment. Even though this system has proven successful in Applied Technology Centers, it has yet to permeate the general high school curriculum.

* The virtual school allows for a greater percentage of students to move from the traditional school environment to other forms of education, such as cooperative learning, apprenticeships, business internships, and early college enrollment.

* In addition to relying solely on commercial publishers for developing courseware, the state (USOE) must provide the infrastructure for the local development of courseware in a multimedia digital format to be shared over the state’s wide-area network. The mechanism is not yet in place to develop and share high quality resources produced at the local level.

* Evaluating courses and granting credit continues to be a major concern. Evaluation standards for courses need to be established at the state level for core curriculum applications, for example the course must meet or exceed the quality of instruction currently being delivered in Utah’s schools. Districts would approve any courses that would be outside the core. Once a course is approved or developed by a district, it would be submitted to the state for broad approval or network access. This provides a mechanism for review and evaluation in order to promote the use of the highest quality material.

* New alternatives for testing, monitoring, and evaluating course completion must be found to correspond with new methods of instruction. The school where the student will be issued credit will be responsible for the testing and granting of credit. A minimum fee ($5.00) would be levied for any exams taken a second or subsequent time.

Expected Benefits

This will allow students in remote locations more course offerings that would otherwise be limited by the number and specialized skills of teachers available. For example, if only a small number of students at a remote wanted to take an AP science course, normally it would not be offered. However, with video classes available, the small group of students could electronically join this class offered in another city. This capability will include technical courses, college prep courses, vocational ed courses, etc. By allowing high school students to also take college level courses electronically, both the student and the state will save money.

Who is Responsible

Dr. Curt Fassen, Director of Utah’s Enhanced Classroom Initiative (801-565-1045) and his professional staff / EDNET / US West / Utah State Office of Education (Jerry Peterson 538-7515) / Division of Information Technology Services

Status as of December 1995

Currently Available for Use. EDNET classes are currently offered in 65 selected site locations throughout the state of Utah. Other sites are being added each year.

In Progress: Convert EDNET's electronic, two way interactive voice and full motion video higher education classes (EDNET) to use the state's wide area network. EDNET plans to implement 16 channel capability, which is still in progress. EDNET and US West plan to add 40 additional sites per year.

Also, by December 31, 1996, Utah will develop 90 core college courses to be available in Utah’s high schools.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Digitized electronic, two-way interactive voice and full motion video for EDNET Higher Education classes. Ultimately, the Governor's vision of an "electronic college" will be available to Utah's citizens. EDNET currently offers similar courses using analog Microwave transmission, and this initiative should shift the transmission medium to be the state's wide area network, making the classes available to a wider potential audience.

Expected Benefits

The State plans to implement two-way video conferencing classes for 90 common core college / university courses. This should reduce demand for buildings and support facilities for higher education (bricks and mortar) allowing significant cost savings. Also, video conferencing college level classes will be available to high school and other students and allow them to take college courses throughout the state, saving money for both the student and the State of Utah.

Who is Responsible

Utah State Board of Regents (Jeff Livingston 321-7121)

Status as of December 1995

Currently Available for Use. EDNET classes are currently offered in 65 selected site locations throughout the state of Utah. Other sites are being added each year.

In Progress: Convert EDNET's electronic, two way interactive voice and full motion video higher education classes (EDNET) to use the state's wide area network. EDNET plans to implement 16 channel capability, which is still in progress. EDNET and US West plan to add 40 additional sites per year.

The Status of Electronic Highway Services in Utah

Using KIOSKS located at convenient locations throughout the state to:

Executive Summary of Service / Initiative Expected BenefitsResponsible OrganizationStatus as of December 1995File Small Claims Court cases.Utah's citizens will be able to more easily file simple court cases.Administrative Office of the CourtsThis can be done at the Sandy Circuit Court (pilot project) and is expected to be implemented in other parts of the state by 1996.Purchase a hunting or fishing license.Improved and more convenient state government services provided to Utah's citizens.Department of Natural ResourcesIn progress by the KIOSK work group, but not implemented yet.Obtain birth or death certificate.(same as above)Department of HealthIn progress by the KIOSK work group, but not implemented yet.Obtain information from the Utah Travel Council.(same as above)Department of Community & Economic DevelopmentIn progress by the KIOSK work group, but not implemented yet.Renew a driver's license. (same as above)Department of Public Safety (Drivers License Division)In progress by the KIOSK work group, but not implemented yet.Renew an occupational or professional license.(same as above)Department of Commerce (Division of Occupational & Professional Licensing)In progress by the KIOSK work group, but not implemented yet.Renew motor vehicle, boat, or RV registration.This will make it easier for Utah's citizens to accomplish this annual exercise without driving to the local county office and waiting in line for long periods of time.Utah State Tax Commission / County GovernmentsThe Utah State Tax Commission is currently studying this project but will require legislation to be passed by the Utah Legislature that will authorize it to use a credit card payment methodology.Obtain information about Utah's state parks or make a reservation at one of Utah's state parks.(same as above)Department of Natural ResourcesIn progress by the KIOSK work group, but not implemented yet.Allow parents of children to obtain immunization records about their children.(same as above)Utah Department of Health (UIIS Project Team)In progress by the KIOSK work group, but not implemented yet.Obtain current job vacancy information from a local, state, and national job data banks.This will make it more convenient for Utah citizens to find out information about job vacancies.Department of Employment SecurityThe Department of Employment Security received a federal grant to move forward with the installation of 4 KIOSKS at pilot locations throughout the state. This effort is being coordinated with other state agencies via the KIOSK work group. The 4 sites are planned to be operational in 1995.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

1. Develop and implement capability for Utah businesses to electronically file monthly, quarterly, and annual business payroll information, such as employee earnings and withholding reports.
2. Develop a capability for Utah's citizens to file state income tax returns electronically. Several options are:
   a.For state income tax returns from business: Tax Connect services.

b. For state income tax returns from individuals: The JELF program
c. For state income tax returns from individuals: Other electronic filing options using commercial tax preparation software.
3. Develop a capability for Utah's citizens to file "no activity" tax returns using telephony based services.
4. Develop a capability for Utah's citizens to electronically obtain tax forms and bulletins at their homes/ businesses using telephony based services.

Expected Benefits

More convenient access to state government services for Utah's citizens.

Who is Responsible

Utah State Tax Commission (Jim Knighton, Director, 530-6146)

Status as of December 1995

In Progress: These initiatives are currently under development and will be available at an undetermined future date.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Per the Practioner's Guide to Electronic Filing in Utah Courts prepared by the Utah Administrative Office of the Courts, user's of Utah's court system will be able to:
1. Draft a legal document for inclusion in the court's case file.
2. Add Standardized Generalized Markup Language (SGML) tags to the document to allow standardization of text and electronic document indexes.
3. The attorneys and others will digitally sign the document, instead of using a traditional legal signature.
4. Electronically mail the document(s) to Courtlink's designated electronic address.
5. Courtlink's efiler program will automatically receive the document(s), assign serial numbers, and make an archive copy of the electronic mail message and source on WORM optical storage media.
6. Courtlink's efiler program will check the input for executable programs, to prevent computer viruses and other unauthorized input.
7. If Courtlink determines the input is electronically acceptable, the document is extracted and a return address automatically prepared.
8. Courtlink will verify all digital signature for authenticity and reformat the document for use by the case file display software. Also, any legal citations are automatically converted to hypertext links to Utah Law on Disc cases or laws referenced.
9. If no errors are detected, the SGML document output will be forwarded to the local court's case file database.
10. At the local court, the database incorporates the above relevant extracted data into the local courts case file database.
11. If no errors are detected in the above checks and processes, the results are electronically notified to the original sender and the document awaits automated case scheduling and court action.

Expected Benefits

The requirement of a legal signature has been a roadblock to using completely electronic filing of legal documents. Once the documents can be remotely electronically filed, they can be more efficiently transported using electronic mail; more efficiently stored in electronic format; and other benefits will result, such as improved productivity, potential cost reductions.

This will eliminate the need for paper versions of legal documents.

Who is Responsible

Utah Digital Signature Legislation Task Force / Administrative Office of the Courts (Rolen Yoshinaga, IT Manager, Courts, 801-578-3872)

Status as of December 1995

In Process: This project is dependent on doing away with traditional signatures on legal documents and using digital signatures. In 1994, a committee developed proposed Digital Signature Legislation which was approved by the Digital Signature Committee, the Utah Information Technology Commission, the ITPSC, the IT Managers committee, the American Bar Association, and is pending introduction / passage by the 1995 Utah State Legislature. Utah emerged as a leader in the nation in this area, and Utah's proposed digital signature legislation has been adopted as the standard by the American Bar Association and several other state and local governments.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Develop the system for Utah businesses to electronically file quarterly payroll information and unemployment tax due to Job Service, using the JSWAGE system .

Expected Benefits

Electronic filing will be faster, less costly and more accurate.

Who is Responsible

Utah Department of Employment Security (Job Service)

Status as of December 1995

In Progress: Businesses currently submit tapes or diskettes. A bulletin board or Internet connection is tentatively planned for Fall 1995.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Develop an electronically accessible reference database of health care information to be available to health care providers and third party payers throughout Utah.

Expected Benefits

This should provide improved information databases about diseases in Utah and how Utah's citizens are treated in health care facilities. Previously, data was accumulated only about birth and death events, not what happened in between.

Who is Responsible

Utah Health Information Network Committee (UHIN) (Dr. Jan Root)

Status as of December 1995

In Progress: A pilot project is currently underway.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

GIS is a method of storing computerized databases in easy to understand visual form that is referenced geographically (by location coordinates). Each type of data is categorized into a GIS data layer. (Examples of GIS date layer types are described below).

Expected Benefits

These different layers can be overlaid to combine one type of data by location with other types of data by location. For example, economic data by map region can be combined with population data for the same geographic location.

Who is Responsible

Division of Information Technology Services (Dennis Goreham 538-3163) / State agencies responsible for data

Status as of December 1995

Currently Available for Use: Utah currently has the following GIS data layers available for use (Source: SGID Users Guide).

BLM Wilderness Study AreasBureau of Land Management1990 Census Tracts (TIGER)County Boundaries (3 scale versions)Davis County1990 Census Places (TIGER)Great Salt Lake Meander LineUtah County1990 Census Block Groups (TIGER)Land Status / Administration / Ownership (3 versions)Avalanche Paths1990 Census County Divisions (TIGER)Municipal BoundariesArcheological Sites1990 Census Blocks (TIGER)Neighborhood CouncilsArcheological AreasEnvironmental Data: Air Criteria Release LocationsParcel OwnershipPublic Service FacilitiesEnvironmental Data: Abandoned MinesProposed Wilderness Areas (several proposals)Weather StationsEnvironmental Data: Lake Monitoring SitesSpecial Tax DistrictsPony Express RouteEnvironmental Data: Stream Monitoring SitesEnvironmental Data: Toxic Release Inventory 1990Geographic Features: Feature NamesQuaternary DeformationEnvironmental Data: CERCLA SitesGeographic Features: General Map AssociationQuaternary FoldsEnvironmental Data: RCRA SitesGeographic Features: Place Names (cities, towns, etc.)Quaternary Volcanic FlowEnvironmental Data: Title 3 SitesLatitude / LongitudeQuaternary Volcanic VentsEnvironmental Data: UPDES SitesPublic Land Survey System (2 versions)Shallow Ground WaterEnvironmental Data: Point Source Monitoring SitesUtah SGID TIC Reference System (2 versions)Slide AreasEnvironmental Data: Underground Storage TanksCoal Deposit AreasDam FailureGeographic Features: 1990 TIGER Feature FramesCRIB DataDam SitesLocatable Mineral AreasFault Lines (2 versions)Drinking Water Sources (2 versions)Oil & Gas Areas (2 versions)Ground Shaking ResponseFlood PlainsOil Shale & Related Substances AreasLandslide PotentialGreat Salt Lake ShorelinesPhysiographic SubdivisionsLandslidesLake Bonneville ShorelinePotash Deposit AreasLiquefaction PotentialSpringsWater Bodies (4 versions)Water Courses (4 versions)Watershed BoundariesWetlandsContours (2 versions)Elevations (2 versions)Soil (2 versions)Water Related Land UseUSFS GSC Primary Base Series1990 Census Blocks Redistricting1990 Census Blocks Redistricting Boundary Names1990 Voting DistrictsSchool Board DistrictsState House DistrictsState Senate DistrictsUS Congressional DistrictsDigital OrthophotosLandsat Thematic MapperAerial Tramways, Monorails, or Ski LiftsAirports (3 versions)Bus RoutesRailroads (3 versions)Restricted AirspaceRoads & Trails (4 versions)Street AddressesTraffic ImpedanceElectrical Generation & Transmission Facilities (2 ver)Microwave RelaysPipeline Transmission LinesSewer linesStorm Drain FacilitiesTelephone CompaniesTelephone /Telegraph Lines & FacilitiesWater Distribution FacilitiesVegetation DistributionThreatened or Endangered VegetationHunting Unit BoundariesPrairie Dog DistributionRaptor Nest / Roost SitesSpecies DistributionUtah Division of Wildlife Region Boundaries

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

1. Convert into digitized document images approximately 2.5 million paper documents about Board of Pardons and Parole managed prisoners and parolees.

2. Within each document, identify any highly confidential data (such as victim names, addresses, and telephone numbers, etc.) and implement sufficient within document security by blocking out selected data for certain viewers, but making the same data accessible to other viewers. Provide a copy of the non-confidential data to each prisoner before their next Parole hearing, as required by the Labrum decision of the Utah Supreme Court.

3. Store all of this data in an optical jukebox storage device that is smaller than a refrigerator.

4. Make the system portable so that Board of Pardons and Parole Commissioners can work at several possible locations (Utah State Prison, Gunnison Prison, telecommuting at their residence, etc.).

Expected Benefits

Imaging offers more efficient document storage and document management services.

Who is Responsible

Utah Board of Pardons & Parole (Laurie Gustin, Project Manager, 801-261-6474) / Recognition International Inc. / Hewlett Packard Corporation

Status as of December 1995

In Process: The imaging system has been purchased and is well into the implementation phase. Desktop hardware and software is being installed and should be completed before the Christmas holidays. A large amount of imaging software customization is being done by Plexus at their facilities in Sunnyvale, California and is expected to be completed and ready for testing in January 1995. The system is set to be in production at the Board of Pardons in February 1995.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

1. Enable the electronic filing of Uniform Commercial Code (UCC) filings to be submitted electronically from remote locations, such a banks, law firms, and businesses. UCC filings are used to perfect creditor positions in secured creditor transactions. Other types of legal documents filed at the Department of Commerce include incorporation records, business registrations, etc. The system that accomplishes this is the DATASHARE system.

2. Image enable the DATASHARE system to allow downloading of Department of Commerce managed documents in the offices of the businesses that request them online for a fee. By July 1, 1996, convert 3 million UCC-1, UCC-II, UCC-III filings, State Incorporation Records, etc. to digitized format. Also, the system will provide for the electronic filing of these documents.

Expected Benefits

This system should (1) improve worker productivity of Department of Commerce employees who must now manually y find and copy the requested documents, (2) avoid lost or misfiled documents, (3) improve the accuracy of records, and (4) make it easier to do business with Utah.

Who is Responsible

Utah Department of Commerce (Keith Van Orden, Project Manager, 801-530-6688)

Status as of December 1995

Currently Available for Use: The DATASHARE system is now available for use by subscribers calling 801-530-6643 for information only about how to access DATASHARE services. After talking to Mya Eddy, DATASHARE Coordinator, a customer can subscribe to the service and will be provided DATASHARE access information.

Current DATASHARE services include the ability to conduct database lookups about document filings, without actually obtaining a certified copy of the document (which will come with the image enabling feature).

In Process: The addition of imaging capability should be available to DATASHARE customers by July 1, 1996. This will allow DATASHARE users to actually download certified copies of UCC filings and other legal documents to receive the copies in their own offices (banks, law firms, etc.).

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Streamline state government financial management and accounting processes and implement a new state government financial management system, called FI-NET, for executive branch departments (except UDOT). This project, called the FIRSTPLUS Project, requires about 80,000 hours of work on the accounting system itself, plus another 80,000 hours of work writing new computer system interfaces between FI-NET and hundreds of smaller state agency systems that integrate with the central accounting system. By July 1, 1994, implement this system into production use by all state agencies except UDOT.

By July, 1 1995, implement the new system for UDOT. (Why is UDOT deferred? Most state agencies use a "period focus accounting method" which follows the budget year. UDOT is "project accounting focused state agency" with federally financed highway projects that span several years, plus must account within a state fiscal year budget cycle.)

Expected Benefits

The new accounting system, named FI-NET, will perform all of the functions that were done by the older accounting system (FIRMS) that are still needed, plus approximately 2,400 new functions. These new functions are needed because of changes in government financial management professional accounting standards, and changes in US government financial grant laws and other policies.

Who is Responsible

Division of Finance (FIRSTPlus Project Team) (Carol Kramer, CPA, Project Director, 801-538-1720)

Status as of December 1995

Currently Available for Use: On July 1, 1994, the new FI-NET information system was placed into production on time and within budget .

In Progress: The UDOT portion of the project is proceeding on schedule.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement a new decision support system that will allow easy extraction of information maintained on the state's IBM mainframe computer. Called "Smartstream", this new decision support system should be easy to use to select and analyze information sorted by needs. This system also needs to be usable on the new personnel management system previously described, and also on selected other state information systems.

Expected Benefits

A decision support system is an easy to use method to download data off IBM mainframe computers.

Who is Responsible

Division of Finance (Harry Sutton, Division of Finance IT Manager, 801-538-3091)

Status as of December 1995

This system is currently available for use.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement a new, computerized child support collection system, known as the ORSIS system. The ORSIS system will electronically collect assets from child support obligors and re-forward the electronic child support payments to the accounts of child support recipients. The requirements are very complex, ranging from capability to collect and re-forward from children having children to searching and collecting from out-of-state parents that choose not to voluntarily support their offspring.

The ORSIS system must meet all the complex federal certification requirements and also be implemented into production use by October 1, 1995. Otherwise, the State of Utah will forfeit $ 85 million in annual federal welfare payments that are currently received from the federal government.

Expected Benefits

Currently, about 50% of child support obligations are met by obligees, 50% are not paid. By requiring 100% mandatory withholding of child support obligations at the payroll distribution time, whether the child support is delinquent or not, will:
1. Promote increased levels of timely payment to child support recipients.
2. Reduce demands for public assistance caused by non-support situations that will be avoided by mandatory 100% withholding.

The ORSIS system will also include several advanced features to locate those parents that choose not to pay child support unless otherwise forced to do so.

Who is Responsible

Department of Human Services ORSIS Project Team (Ken Matheson 801-538-4410) / IBM Corporation

Status as of December 1995

In Progress: This project is currently anticipated to meet the October 1995 federal deadline.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement a new Electronic Birth Certificate (EBCIS) Information System. This will be piloted at the University of Utah Medical Center. EBCIS is a method of digitally recording and storing birth certificate information. Shortly after completing the pilot test, the system will be expanded to Davis and Wasatch counties, and then to the rest of the state. (Utah is purchasing a NISE WEST EBC system). This EBC system will record the child's name, gender, date of birth, and mother's maiden name. Also, a social security number will be requested, but not mandated.

Currently, 80% of Utah births occur in Utah's 15 largest hospitals. Seven of these 15 hospitals already use an electronic birth certificate system. Utah's system will use the existing digitized birth records and expand it to the other hospitals.

Expected Benefits

Who is Responsible

Utah Department of Health (Bureau of Vital Statistics)

Status as of December 1995

In Progress: This system effort is progressing as planned.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement Phase I of the Utah Statewide Immunization Information System (USIIS). Phase I consists of installing USIIS at four pilot sites: Davis County Health Dept., Wasatch City/County Health Dept., Wasatch Homeless Health Program , and Cottonwood Pediatrics.

"Utah's vision for USIIS is to create a cost effective, user friendly, on-line, interactive, accurate and timely statewide immunization tracking system that will link all immunization providers and records to a central database which can be accessed in many ways."

By January 1996, implement Phase II of USIIS in the rest of the state. By 1997, implement Phase III by adding GIS capability to the system, bi-lingual capability, telephone inquiry capability, and linking USIIS to the Indian Health Services database. GIS will allow tracking all immunizations by geographic location. (For more details on GIS, see the GIS section of projects). By 2000, implement Phase IV by adding the ability for parents to access USIIS immunization information using KIOSKS located in major stores and malls. Phase IV will also include allowing day care providers to access USIIS information.

Expected Benefits

About half of the preschool children in Utah are not adequately immunized against communicable disease, such as whooping cough, polio, measle s and other preventable diseases. Utah's immunization status for two year old children is among the lowest in the nation.

Most immunization records in Utah are currently "encounter based" and kept by individual parents on hand written "immunization card(s)". By matching birth records and other sources of data, immunizations can be "proactively administered" by contacting parents of children not immunized, per the centralized database. This should help Utah reach its goal to have 90% of children under age two adequately immunized.

Who is Responsible

Utah Department of Health, Local Health Departments, Community & Migrant Health Care Centers, and Private Providers

Status as of December 1995

In Progress: So far, this project is moving forward as planned.

The Status of Electronic Highway Services in Utah

Executive Summary of Service / Initiative

Implement an Automated Point of Entry System for the Utah Department of Transportation (UDOT) that will:
1. Automatic credential checking for commercial trucks with transponders attached to the truck.
2. Automated issuance of permits, citations, and create accounting records.
3. Create and automatically check / update an insurance database, operating authority database, and a fuel tax permit database.

Expected Benefits
1. Improve productivity of Port of Entry state workers.
2. More accurate checking of commercial vehicles.
3. Reduce driver down time at the Port of Entry which will increase their productivity.

4. Lower fuel consumption for commercial vehicles.
5. Improve profitability for motor carriers and reduce costs to the state.

Who is Responsible

Utah Department of Transportation (Dave Burton 801-965-4220)

Status as of December 1995

Currently Available for Use: Phases I and II of this system are in operation.

In Process: Phase III is still under development.

The Status of the Governance Structure

Executive Summary of Service / Initiative

Following passage by the US Congress, and anticipated Presidential approval, of either H.R. 3636, H.R. 3626, or S. 1086, extensive changes in FCC regulation of the cable TV and telecommunications industries will occur at the federal level that will significantly impact the current state regulatory practices.

After sorting out the final versions of the federal changes, Utah will need to revise its state regulatory legislation and environment according

* The 1995 Legislation:
  * US House Resolution 514
    * US House Resolution 1555, "The Communications Act of 1995"
    * US House Resolution 1556
    * US Senate Bill No. 562, "
  * US Senate Bill No. 652, "The Telecommunucations Competition and Deregulation Act"

Expected Benefits

1. Allow new "local electronic companies (LECs)" that may be created under the new legislation (merged telephone/cable TV business entities) to be regulated as such.
2. Allow local telephone service to be provided by cable TV companies or long distance providers.
3. Allow regional Bell operating companies (RBOCs) to compete in long distance and video programming markets.
4. Restrict RBOCs from acquiring cable TV companies in the same markets the RBOCs currently operate within.
5. Restrict or eliminate the ability of states to regulate the telecommunications industry.

Who is Responsible

US Congress

Status as of December 1995

In Progress: The National Governors Association and the State of Utah took positions in opposition to the 1994 Bills restriction of the states authority to regulate telecommunications. The legislation did not pass Congress. New versions were introduced in 1995, as listed above.

The Status of the Governance Structure

Utah state government manages information technology (IT) using a combination of methods, with an overall goal to provide a seamless integration of service delivery to customers of state government services.

Utah has three major branches of government, plus two large segments that operate quasi-independently under state governing boards. These are:
1. Executive branch.
2. Legislative branch.
3. Judicial branch.
4. Higher education, which operates under the state's Board of Regents.
5. Public education, which operates under the state's Board of Education.

In combination, these five organizational units provide a rainbow of services to Utah's citizens.

Management of information technology in Utah is accomplished with a very cooperative attitude, while still maintaining the required constitutional separations inherent to state government. Visitors to Utah state government from several other states have expressed amazement about how effectively this actually works in Utah and leave wishing they had a similar situation in their states.

All state government managers recognize the need for a transparent delivery of services to Utah's citizens. Utah has a political climate which strongly supports the use of information technology in innovative ways to improve the delivery of government services to Utah's citizens. This originates at the highest levels: Utah's Governor and the Utah State Legislature, and works its way down through all organizations. State policy is clear. Actual implementation of information technology plans and resolution of issues, both non-technical and technical, occurs using the following structure:

In 1994, the Utah Legislature established the Utah Information Technology Commission to:
(a) Study Utah's present and future information technology needs.
(b) Make recommendations regarding the coordination and governance of the IT needs of executive, legislative, and judicial branches of government.
(c) Solicit and consider recommendations made by the Governor, Judiciary, Legislature, and the public regarding IT.
(d) Consider the scope of the Public Service Commission's IT regulatory authority.
(e) Consider economic development issues with regard to IT.
(f) Receive reports from the executive, judicial, and legislative branches concerning expenditures for IT and appropriation requests, and make recommendations to the Legislature.
(g) Review and analyze any IT issue of interest.
(h) Prepare legislation concerning IT.

The Utah Information Technology Commissioners are senior level representatives from the five government groups previously described, plus senior level representatives from the private sector (telecommunications providers, IT industry association representatives) and private citizens.

State Information Technology Coordinator

The SITC's vision is to stimulate a whole new level of performance by guiding the appropriate and innovative use and management of information technology in state government. The SITC's mission is to serve as a catalyst to further the initiatives of the Governor and meet customer needs through leadership, coordination, planning, and oversight of information technology.

The SITC and SITC professional staff:
1. Develop the automated state-wide IT planning methodology.
2. Conduct technical reviews of each state agency information technology plan and its integration with the agency's overall strategic plan.
3. Provide professional consulting services to state agency IT managers.
4. Develop state-wide IT policies, procedures, and professional standards.
5. Coordinate and/or conduct quality assurance reviews of major systems integration projects.

Using a fully automated process (Envision-IT) , state agencies electronically prepare and submit annual information technology plans to the SITC staff. Envision-IT is project management focused: Each agency IT project must identify cost and other detail estimates for hardware, software, labor, contractual service, and other project categories needed to bring it into production; a specific project management contact; key project milestone estimates; and other data. Large projects must identify the systems development methodology to be used, the automated project management techniques to be used; the quality assurance plan for the project; and other data. This focus allows early identification of projects that impact other state agencies, ties in with the overall state budget process, and positions each individual IT initiative toward full implementation of a performance measure system.

Also included within Envision-IT are surveys of planned and actual progression into about forty emerging technology areas; inventories of hardware and software resources, both on-hand, planned acquisitions, and planned retirements.

Overall, Envision-IT paints a state-wide picture of trends, the aging of the state's software and hardware inventories, provides all agency IT managers with a resource to see what other agencies are doing, and promotes sharing of resources and learning experiences in each technical area. Using Envision-IT, the state can accurately describe planned software and hardware purchases within the next 12 months, promoting state-wide purchasing agreements with vendors, and allowing the state's vendor partners an accurate preview of near-term planned purchases.

The SITC staff approves each IT related project initiated by state agencies. This assures a coordinated effort among the state agencies, including estimates of cross-agency project impacts. Once a project has been approved, all authority to implement, acquire, contract, or pay for IT related acquisitions for that project is empowered back to the project or agency IT manager(s).

The SITC also provides network and technical IT support to the Governor's office and related sections within the Governor's office, including LAN support, information systems development and programming, and also serves as the central coordination point for Utah's electronic highway initiative(s). Professional Staffing: 6 IT Professionals.

The ITPSC reviews state agency information technology plan approvals, denials, and recommendations conducted by the State Information Technology Coordinator's office; acts as an appeal authority to SITC staff decisions; approves state-wide

policies, procedures, and standards; and serves as an executive level catalyst to assure rapid implementation and support of policy decisions to be implemented in all state agencies. Membership consists of executive directors, assistant directors, or other agency designated representatives from the five components of government previously described. The ITPSC meets monthly.

The ITPSC also has an executive committee which meets weekly to coordinate and reach executive level decisions on some state-wide information technology issues.

This group discusses and resolves more technical state-wide information technology issues than those covered by the ITPSC. It consists of IT managers from the five state agency groups previously described. Representatives from local government are also encouraged to attend the monthly meetings.

This committee advises the Judicial branch of government on information technology issues and consists of a representative group of Judges, Court Administrators, Courts IT managers, and others from within the Judicial branch only.

This committee includes representatives from / and coordinates IT needs and plans of the state's Legislative offices: Legislative Fiscal Analyst, Legislative Research & General Counsel, Legislative Auditor, and the Legislature.

This group provides state and local government agencies with mainframe computing, networking , telephone, and radio services and has an authorized staffing of 220 IT professionals. In Utah state government, systems development occurs in state agencies and ITS provides the mainframe and telecommunications services to run the agency computer programs and data. (State agencies also provide their own agency with mini computer and LAN services).

This group is coordinating efforts to merge the Utah Education Network with the state's UtahNet wide area network.

The Utah Education Network exists to provide a quality instructional and informational service by harnessing telecommunications technology in the service of education for the benefit of Utah learners. The Network does this by planning, constructing, maintaining, managing, and programming the state's non-broadcast education systems (EDNET, ITFS) broadcasting stations (KULC-TV Channel 9 and the daytime schedule on KUED-TV Channel 7), on behalf of Utah's systems of higher and public education and state government. Network staff also provide leadership, advice, and advocacy to educators and public officials in the field of telecommunications.

This group coordinates the work of developing a library and educational data network.

This steering committee coordinates Utah's higher education information technology initiatives.

This is a group of critical associates who network together on technical networking topics for K-12 schools. It was created under the leadership of the ETI.

Several of the following are function- specific subcommittees of the ITPSC or IT Managers Committee:

This group promotes the sharing of information concerning state-wide procurement of desktop PC products and includes representatives of state agencies.

This commitee is comprised of representatives of state agencies that publish or plan to publish Folio infobases for distribution. The group meets to coordinate efforts and discuss Folio related issues.

The E-mail committee recommends electronic mail standards and policies that promote the use of electronic mail to improve communication within Utah state government.

This committee promotes and maintains coordination and communication among LAN Administrators in the State of Utah for the exchange of ideas, research, and the implementation of information technologies to improve networking, communications, integration, and functions as a unified voice for support providers.

USUG is a group of state agency information security professionals who work together to promote confidentiality, integrity, and availability of information and technology resources by identifying and evaluating issues, and recommending strategies. USUG strives to ensure the highest possible level of information security in Utah State Government by fostering appropriate use, and management of information security technologies.

This group is coordinating efforts by state government and local businesses for the SmartUtah project which will provide services to Utah's business community.

This group is coordinating state-wide efforts toward acquiring a universal magnetic stripe card for state services.

This group is coordinating efforts to use information technology for job training applications.

This group is coordinating efforts to provide state services using KIOSK technology.

This group is coordinating efforts and providing a resource for acquiring federal electronic highway grants.

This group is coordinating efforts to implement digital signatures on legal documents.

This is a committee of state and local government representatives actively involved in geographical information system (GIS) activities.

This group is defining the migration path that will replace existing land mobile radio technology with the next generation of radio services. The committee's goal is to develop a 800 MHz network that will support both voice and data applications and accommodate the current and future needs. The projected system will support cities, counties, and state agencies and associated medical services.

This group includes representatives from the Executive, Legislative, and Court branches of state government to coordinate issues concerning Utah Law on Disc. Utah Law on Disc is a Folio based hypertext-linked database of Utah case law, the Utah Code Annotated, Utah Court Rules Annotated, Federal Cases and Tables, Opinions of the Attorney General, the Utah Administrative Code, Utah Executive Documents, and Utah Judicial Decisions that include Utah Supreme Court Decisions from January 1945 through June 1994 and Court of Appeals Decisions from April 1987 to June 1994.

This group includes representatives from State Divison of Finance, other state agencies, and Novell, Inc. The goup’s purpose is to recommend electronic forms standards including: security, electronic signature, product integration, software, hardware, applications, and work flow. The group is also developing a common directory of electronic forms applications to be used by state agencies.

CategoryBroadcast Channel NameAvailabilityAvailabilityAvailabilityAvailabilityAvailabilityEducationalArts & Entertainment (A&E)YesYesYesYesEducationalDiscovery Channel - EastYesYesYesYesEducationalDiscovery Channel - WestYesEducationalThe History Channel YesYesEducationalJones Computer Network EducationalThe Knowledge NetworkYesEducationalThe Learning Channel (TLC)YesYesYesEducationalMind Extension University (MEU)YesEducationalNebraska

State Telelearning CenterYesEducationalSTEP ClassesYesEducationalChannel OneYesNews & InformationAll News ChannelYesYesNews & InformationCNBCYesYesYesNews & InformationCNN Headline News (HNN)YesYesYesYesNews & InformationCable News Network (CNN)YesYesYesYesNews & InformationCable News Network International (CNN-I)YesYesNews & InformationCourt TVYesYesNews & InformationC-SPANYesYesYesYesNews & InformationC-SPAN II (US Senate)YesYesNews & InformationNew England Cable News NetworkYesNews & InformationUSIA Worldnet / CSPANYesNews & InformationCNI NewswireYesNews & InformationBloomberg DirectYesNews & InformationNewsworld InternationalYesEntertainmentGala Americana InternationalYesEntertainmentAmerican Independent Network (AIN)YesEntertainmentAmerican Movie Classics (AMC)YesYesYesEntertainmentAmerica's Talking (AT)YesYesEntertainmentBest Picture ShowYesEntertainmentBlack Entertainment TV (BET)YesYesEntertainmentBravoYesYesEntertainmentCable Health ClubYesEntertainmentCaribbean SuperstationYesEntertainmentCartoon Network (TOON)YesYesYesEntertainmentChannel AmericaYesEntertainmentCinemax-EastYesYesYesEntertainmentCinemax-WestYesYesYesEntertainmentCinemax-East 2YesEntertainmentCinemax-West 2YesYesYesEntertainmentComedy Central-EastYesYesEntertainmentComedy Central-WestYesEntertainmentDisney Channel-EastYesYesYesEntertainmentDisney Channel-WestYesYesEntertainmentDisney Channel 2YesYesEntertainmentE! Entertainment TVYesYesEntertainmentEncoreYesYesYesYesEntertainmentEncore-Love StoriesYesYesYesEntertainmentEncore-MysteriesYesYesYesEntertainmentEncore-WesternsYesYesYesEntertainmentEncore-ActionYesEntertainmentEncore-True Stories & DramaYesEntertainmentEncore-WAM! (Teen TV)YesEntertainmentFad TV (Nov 94)EntertainmentFamily Channel-EastYesYesEntertainmentFamily Channel-WestYesYesEntertainmentFamilyNetYesEntertainmentFlixYesYesEntertainmentFX-EastYesYes (except Insight Cable)EntertainmentFX-WestYesEntertainmentfXM: Movies from FOXEntertainmentGame Show Network EntertainmentHome Box Office-East (HBO-E)YesYesEntertainmentHome Box Office-West (HBO-W)YesYesYesEntertainmentHome Box Office- 2 East (HBO-2E)YesYesEntertainmentHome Box Office- 2 West (HBO-2W)YesYesYesEntertainmentHome Box Office-3 East (HBO-3E)YesYesEntertainmentHome Box Office-3 West (HBO-3W)YesYesEntertainmentHomeNetYesEntertainmentHome & Garden Television (HGTV)YesEntertainmentIndependent Film ChannelYesYesEntertainmentLas Vegas TV NetworkYesEntertainmentLifetime-EastYesYesYesEntertainmentLifetime-WestYesEntertainmentMain Street TVYesEntertainmentMinority Broadcasting MoviesYesEntertainmentThe Movie Channel-EastYesYesEntertainmentThe Movie Channel-WestYesYesEntertainmentThe Nashville Network (TNN)YesYesYesEntertainmentNational Access TVYesEntertainmentNational Home NetworkYesEntertainmentNational Program NetworkYesEntertainmentNetwork OneYesEntertainmentNickelodeon-EastYesYesYesEntertainmentNickelodeon-WestYesEntertainmentNostalgia Romance ClassicsYesEntertainmentOutdoor ChannelYesEntertainmentSci-Fi ChannelYesYesYesEntertainmentSega Channel (video games) (Fall '95)EntertainmentShowcase AmericaYesEntertainmentShowtime-EastYesYesEntertainmentShowtime-WestYesYesEntertainmentShowtime 2YesYesEntertainmentStarNetYesEntertainmentStarzYesYesYes (except Insight Cable)EntertainmentSundance Films Channel (Fall '95)EntertainmentTurner Network Television (TNT)YesYesYesEntertainmentTurner Broadcast System (TBS)YesYesYesEntertainmentTurner Classic Movies (TCM)YesYesYesEntertainmentTVN Promotional ChannelYesEntertainmentUSA Network-East (USA-E)YesYesYesEntertainmentUSA Network-West (USA-W)YesEntertainmentThe United / Paramount Network (Jan '95)YesEntertainmentTrioYesEntertainmentThe WB Television Network (Jan '95)YesMajor Networks (ABC)American Broadcasting Corporation (ABC) - Utah's local ABC affiliate - Channel 4YesMajor Networks (ABC)KOMO SeattleYesMajor Networks (ABC)KUSA DenverYesMajor Networks (ABC)WABC New YorkYesYes (with FCC restrictions)Major Networks (ABC)WPLG MiamiYesYesMajor Networks (NBC)National Broadcasting Corporation (NBC) Utah's local NBC affiliate - KSL Channel 5)YesMajor Networks (NBC)KCNC DenverYesMajor Networks (NBC)KNBC Los AngelesYesMajor Networks (NBC)WBZ BostonYesYesMajor Networks (NBC)WXIA AtlantaYesYes (with FCC restrictions)Major Networks (NBC)NBC EastYesYesMajor Networks (NBC)NBC CentralYesMajor Networks (NBC)NBC PacificYesMajor Networks (CBS)Columbia Broadcasting System (CBS) -Utah's local CBS affiliate - KUTV channel 2.YesMajor Networks (CBS)KMGH DenverYesMajor Networks (CBS)KPIX San FranciscoYesMajor Networks (CBS)WRAL Raleigh (CBS)YesYes (with FCC restrictions)Major Networks (CBS)WUSA Washington DCYesYesMajor Networks (FOX)FOX Broadcasting (FOX) - Utah's local FOX affiliate KSTU channel 13.YesMajor Networks (FOX)KDVR DenverYesMajor Networks (FOX)WFLD ChicagoYesMajor Networks (FOX)San FranciscoYesYes (with FCC restrictions)YesMajor Networks (FOX)FOX-EastYesMajor Networks (FOX)FOX WestYesMajor Networks (FOX)FOXNetYesMajor Networks (PBS)Nebraska PBSYesMajor Networks (PBS)KRMA DenverYesMajor Networks (PBS)PBS PhiladelphiaYesYesMajor Networks (PBS)Public Broadcasting System (PBS)YesYes (with FCC restrictions)Yes (KBYU, KUED)Major Networks (CBC)Canadian Broadcasting Corporation (CBC) North - EastYesMajor Networks (CBC)Canadian Broadcasting Corporation (CBC) North - PacificYesMusic VideoThe BoxYesMusic VideoClassic Arts ShowcaseYesMusic VideoCountry Music TVYesYesYesMusic VideoBET on Jazz: The Cable Jazz Channel) Music VideoMTV:Music Television-EasternYesYesYesMusic VideoMTV: Music Television-WesternYesMusic VideoMOR Music TVYesMusic VideoMuch Music USAYesYesMusic VideoVideo Hits One (VH1) YesYesPay Per ViewAction PPVYesYesPay Per ViewPlayboy PPV or monthly subscriptionYesYesPay Per ViewPrimeStar PPV 2 Hot ChoiceYesPay Per ViewRequest TV PPVYesYesYesPay Per ViewTV Erotica PPVYesPay Per ViewTheaterVision 1 (TVN1) PPVYesPay Per ViewTheater Vision 2 (TVN2) PPVYesPay Per ViewTheater Vision 3 (TVN3) PPVYesPay Per ViewTheater Vision 4 (TVN4) PPVYesPay Per ViewTheater Vision 5 (TVN5) PPVYesPay Per ViewTheater Vision 6 (TVN6) PPVYesPay Per ViewTheater Vision 7 (TVN7) PPVYesPay Per ViewTheater Vision 8 (TVN8) PPVYesPay Per ViewTheater Vision 9 (TVN9) PPV-Cable VideoSourceYesPay Per ViewTheater Vision 10 (TVN10) PPV-Spice Adult EntertainmentYesPay Per ViewDirecTV PPV (Special Events: such as Championship Boxing, Concerts, Wrestlemania, Ultimate Fighting Championships, etc.) YesPay Per ViewCollege Football PPVYesPay Per ViewNFL Football PPV (all teams, all season)YesPay Per ViewNBA Basketball PPV (all teams, all season)YesPay Per ViewNHL Hockey PPV (all teams, all season)YesPay Per ViewViewer's Choice PPVYesYesPay Per ViewEmpire Sports Network PPVPay Per ViewHSE PPVPay Per ViewHSE Alternate PPVPay Per ViewHTS PPVPay Per ViewKBL Sports PPVPay Per ViewMadison Square Garden PPVPay Per ViewPASS PPVPay Per ViewPrime Sports NW PPVPay Per ViewPrime Sports Alternates PPVPay Per ViewPrime Ticket PPVPay Per ViewPrime Network PPVPay Per ViewPrimeTime 24 PPVPay Per ViewSportSouth PPVPay Per ViewSunshine Network PPVPay Per ViewTurner Premiere PPVSuperstationWGN-ChicagoYesYesSuperstationWTBS-AtlantaYesYesYesSuperstationKTLA Los AngelesYesSuperstationKTVT Fort WorthYesSuperstationKWGN DenverYesSuperstationWPIX New YorkYesSuperstationWSBK BostonYesSuperstationWWOR New YorkYesSportsCaliente RacingYesSportsEmpire Sports NetworkYesYesSportsESPNYesYesYesSportsESPN 2 (The Deuce)YesYesSportsESPN AlternateYesYesSportsESPN Alternate 2YesYesSportsThe Golf ChannelYesYesSportsHome Sports Entertainment (HSE)YesYesYesSportsHome Team Sports (HTS)YesYesYesSportsKBL Sports Network-Pittsburgh (KBL)YesYesYesSportsMadison Square Garden Sports Network (MSG)YesYesYesSportsMidwest Sports ChannelYesYesSportsNew England Sports Network (NESN)YesYesYesSportsNewSportYesSportsPrime Sports Network (PSN)YesYesYesSportsPrime Sports-Intermountain WestYesYesSportsPrime Sports-Upper MidwestYesYesYesSportsPrime Sports-NorthwestYesYesYesSportsPrime Sports-Rocky MountainYesYesSportsPrime Ticket (PRTK)YesYesYesSportsPro Am Sports System (PASS)YesYesSportsProStarYesSportsSports Channel-ChicagoYesSportsSports Channel-FloridaYesSportsSports Channel-New EnglandYesSportsSC America-NY PlusYesSportsSports Channel-New YorkYesSportsSports Channel-Cincinatti, Ohio, FloridaYesSportsSports Channel-PhiladelphiaYesSportsSports Channel-PacificYesSportsSports New Satellite (SNS)YesSportsSportSouth (SPSN)YesYesYesSportsSunshine Network (SUN)YesYesYesSpecial InterestThe Travel NetworkYesYesSpecial InterestCalifornia ChannelYesSpecial InterestGlobolat BingoYesSpecial InterestThe Ecology ChannelSpecial InterestGOP-TVYesSpecial InterestThe Health ChannelSpecial InterestKaleidoscope TVYesSpecial InterestNASA Select ChannelYesSpecial InterestNational Empowerment TVYesSpecial InterestOPENetYesSpecial InterestOstrich-EMU TVYesSpecial InterestTVNCYesSpecial InterestThe Weather ChannelYesYesYesYes (daytime only)Special InterestWeather NetworkYesSpecial InterestThe National Weather NetworkYesHome ShoppingAmerican Information ChannelYesHome ShoppingHome Shopping Network 1YesYesHome ShoppingHome Shopping Network 2YesHome ShoppingHome Shopping ClubYesHome ShoppingProduct Information NetworkYesHome ShoppingQVC Fashion ChannelYesHome ShoppingQVC NetworkYesYesHome ShoppingSELLVisionYesHome ShoppingShop at HomeYesHome ShoppingShopper Vision (mid '95)Home ShoppingTV Factory DirectYesHome ShoppingShop at HomeYesHome ShoppingTV Factory DirectYesHome ShoppingValueVisionYesHome ShoppingViaTVYesHome ShoppingVideo Catalog ChannelYesReligiousAble TelecommunicationsYesReligiousChristian TV Network (CTV)YesReligiousDr. Gene ScottYesReligiousWPCB (Cornerstone TV)YesReligiousEternal World TV NetworkYesReligiousThe Family NetworkYesReligiousFaith & Values NetworkYesReligiousKeystone Inspirational NetworkYesReligiousLa Cadena del Milagro (Spanish)YesReligiousL.D.S. ChurchYesReligiousNew Inspirational NetworkYesReligiousSDA Good News NetworkYesReligiousShepherd's Chapel Network (NCN)YesReligiousThree AngelsYesReligiousTrinity Broadcasting NetworkYesReligiousWorld Harvest TVYesReligiousThe Worship NetworkYesReligiousVISNYesYesReligiousZ Music (religious music video)YesInternational InterestAntenna Greece (Greek)YesInternational InterestArab Network of AmericaYesInternational InterestCBC-East (French)YesInternational InterestCFTM-Montreal (French)YesInternational InterestCanal de Noticias (Spanish)YesInternational InterestDeutsche Welle (German)YesInternational InterestEDTV Dubai TV (Arabic)YesInternational InterestGems TV (Spanish)YesInternational InterestThe International ChannelYesInternational InterestIrish ChannelYesInternational InterestJade TV (Chinese)YesInternational InterestNACTV NetworkYesInternational InterestNHK (Japanese)YesInternational InterestRAI/USA (Italian)YesInternational InterestRadio Television Portugal (RTP) (Portugese)YesInternational InterestSCOLA International NewsYesInternational InterestSEP (Spanish)YesInternational InterestSUR (Spanish)YesInternational InterestTelemundoYesInternational InterestTV Asia (Hindi) (Northern India)YesYesInternational InterestTV5 Quebec (French)YesInternational InterestUnivision (Spanish)YesInternational InterestWMNB-NY (Russian)YesInternational InterestXEIPN-Mexico CityYesInternational InterestXEW Televisia-Mexico City (Spanish)YesInternational InterestXEWH-Hermosillo (Spanish)YesInternational InterestXHDF-Mexico City (Spanish)YesInternational InterestXHGC-Mexico City (Spanish)YesInternational InterestXHMT-Mexico City (Spanish)YesInternational InterestXHFM-Vera Cruz (Spanish)Yes